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ABSTRACT

This report focuses on a study that examined skills, recruitment, and training issues covering the whole pharmaceutical industry. It presents mailed survey material complemented and enhanced by a series of telephone interviews and focus groups. Chapter 1 is an introduction. Chapter 2 deals with the structure of the sector and reports background data on the size of the sector in terms of employment and research and development. Chapter 3 covers the survey sample and response and details how the sample was constructed, the pattern of response to the survey, any potential biases, and the results of a non-response analysis. Chapter 4 examines evidence from the survey relating to the National Training Targets, such as targets for adults and organizations. Chapter 5 covers a range of skills, recruitment, and training issues, in terms of subsectors of the pharmaceutical sector and in terms of educational levels. Chapter 6 deals with other training issues, such as barriers to training and non-pharmaceutical specific training. Chapter 7 examines evidence of the regional dimension of the pharmaceutical and biopharmaceutical sector and its skills and training issues. Chapter 8 uses data from the Higher Education Statistics Agency to examine how the higher education output relates to the sector. Chapter 9 contains the summary and recommendations. (Contains 12 references and a questionnaire.) (YLB)

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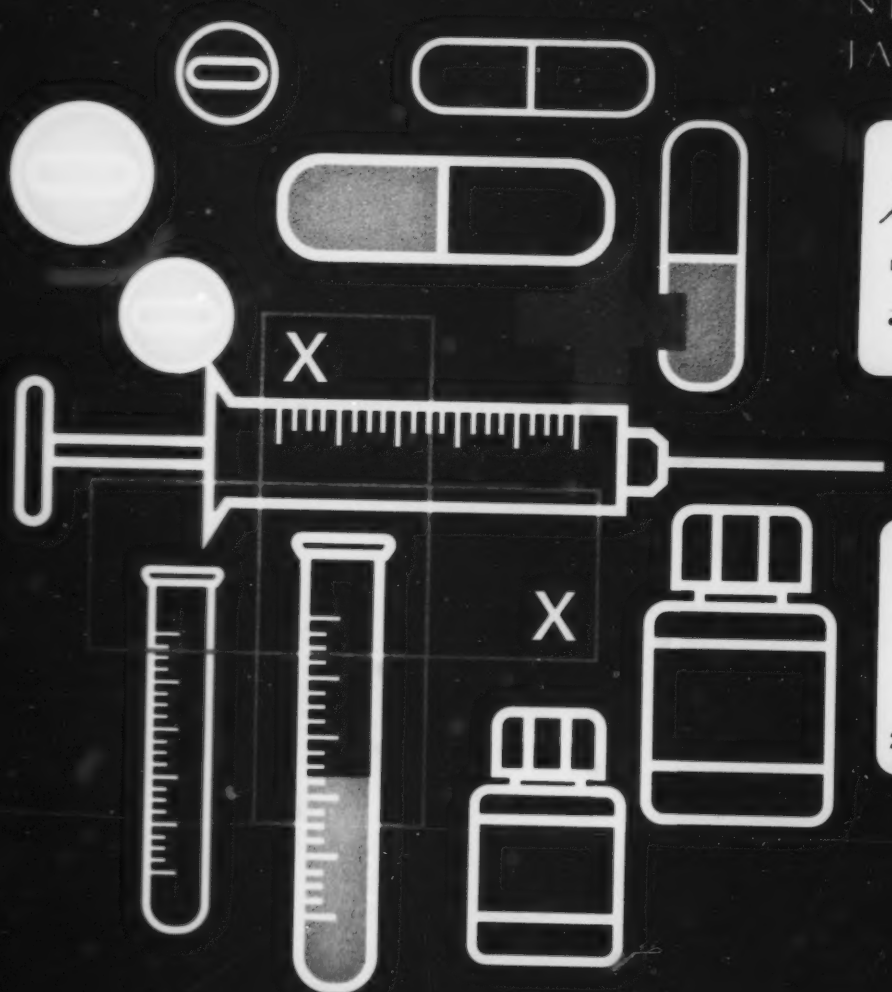
Skills for a Competitive Future: a survey for the Pharmaceutical Industry National Training Organisation

N Jagger
J Aston



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IES aims to help bring about sustainable improvements in employment policy and human resource management. IES achieves this by increasing the understanding and improving the practice of key decision makers in policy bodies and employing organisations.

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Executive Summary

The 'Skills for a Competitive Future' study was undertaken by the Institute for Employment Studies (IES) for the Pharmaceutical Industry National Training Organisation (PhINTO). The study was designed to examine skills and training issues for the pharmaceutical industry and examine the sectors contribution to the National Training Targets.

The pharmaceutical industry

Official government statistics indicate that the pharmaceutical industry has about 55,000 employees in 725 establishments. These establishments are mainly small: 58 per cent of establishments have fewer than ten employees, and a further 20 per cent of establishments have between ten and 49 employees.

This agrees with PhINTO's own assessment of the industry and is represented in the coverage of the 'Skills for a Competitive Future' survey.

Difficulties recruiting skills

Essentially, the main problems with recruitment are around skills that are highly specific to the pharmaceutical industry and without a clear higher education background discipline.

- There are difficulties recruiting those involved in patenting, despite the small numbers involved.
- This is especially a problem for those involved in new drug discovery, and the smaller organisations who consider these people to be very important to their organisations.
- Registration and regulatory affairs is another area where, despite the small numbers involved, the importance of the function makes recruitment problems serious.
- IT, and the skills needed to bring a product to market, such as pre-clinical trials and pre-registration trials, also poses a problem.
- Sales and marketing skills, although ranked low as a recruitment problem, were very important to virtually all the survey respondents and, combined with the low retention rates, generate a significant training burden.

Difficulties delivering training

Pharmaceutical organisations were asked which areas gave rise to training problems. Overall, the non-pharmaceutical training issues are less problematic than pharmaceutical industry specific ones.

- Obtaining training covering patenting and registration and regulatory affairs is most problematic.
- The more generic IT and computing, and sales and marketing training requirements are much easier to fulfil.

Barriers to training

A variety of barriers to increased training provision were identified:

- 'cost of external courses' and 'fees for consultants' are rated as the most important barriers to training
- these problems are most acutely felt by the smaller establishments
- those not recognised by IiP are also more likely to cite these as barriers.

Recruitment of graduates

The Higher Education Statistics Agency (HESA) provided data on the background of all graduates entering the pharmaceutical sector. These show that:

- 1,003 first degree graduates, 302 postgraduates and 24 sub-degree graduates were recruited from the 1996/97 academic year's cohort
- over half (53 per cent) of the graduate entrants were female, although the majority (53 per cent) of the postgraduate entrants were male
- in terms of subjects studied by first degree entrants, the largest group were biological scientists (26 per cent), followed by physical scientists (21 per cent) and subjects allied to medicine (14 per cent).

Investors in People

One of the National Training Targets aims to have 45 per cent of medium or large organisations (more than 50 employees) recognised as Investors in People by 2002. Another aims to have 10,000 small organisations (between ten and 50 employees) recognised.

As yet, only 28 per cent of organisations with more than 50 employees are recognised, compared with a target of 45 per cent. When the pattern is examined in detail, the main problem appears to be with the small to medium sized organisations, as those with more than 1,000 comfortably meet the target. Organisations with between 11 and 49 employees comfortably meet the implicit target of four per cent. However, there is a worrying number of these organisations not going for re-recognition.

National Attainment Targets

The two other National Learning Targets relate to the educational attainment of the adult population. The first target states that 50 per cent of adults should have a qualification of at least NVQ level 3, or above, by the year 2000. The second target states that 28 per cent of the adult population should have a qualification at NVQ level 4, or above, by the year 2000.

Overall, 53 per cent of employees have at least an NVQ level 4 qualification, compared with the target of 28 per cent, and 67 per cent have at least an NVQ level 3 qualification, compared with the target of 50 per cent. This high skill profile is particularly pronounced in the smaller establishments, with those with between one and ten employees having 70 per cent with at least an NVQ level 4 qualification, and 80 per cent with at least an NVQ level 3 qualification.

The survey

This analysis of the pharmaceutical survey is based on a postal survey of a representative and inclusive sample of the industry. Starting from the membership lists of the Association of the British Pharmaceutical Industry (ABPI), the Proprietary Association of Great Britain (PAGB), British In-Vitro Diagnostics Association (BIVDA), and the Bio-Industry Association (BIA), a sample of those involved in recruitment and training issues in the wider industry was developed. In all, 148 responses were obtained from across the pharmaceutical industry.

Recommendations

The report makes the following recommendations to PhINTO:

- Help set up training standards and industry-wide occupational standards for areas highly specific to the pharmaceutical industry, such as regulatory affairs and patenting.
- Further review the barriers to Investors in People, especially amongst SMEs.
- Examine the training of medical representatives, although this is possibly due more to high levels of turnover and a constant need for updating.

1. Introduction

The Institute for Employment Studies (IES) was commissioned by the Pharmaceutical Industry National Training Organisation (PhINTO) to undertake a survey of skills and training issues in the sector. The primary aim was to develop a sample, and design a questionnaire, to act as the basis for ongoing monitoring of skills and training issues in the pharmaceutical and bio-pharmaceutical industries. The sample aimed to cover as much of the sector as possible, with as complete a coverage in terms of size, sub-sector and geography as possible.

The report feeds into PhINTO's strategic planning and their contribution to the National Skills Foresight exercise. The survey material is complemented by supporting secondary data from a range of sources which allows specific aspects of the sector to be examined. The postal survey was complemented and enhanced by a series of telephone interviews and focus groups designed to explore some issues to be explored in more depth.

This report covers the results of these varied linked exercises.

The report consists of eight further chapters:

- **Chapter 2** deals with the **Structure of the Sector** and reports background data on the size of the sector in terms of employment and R&D.
- **Chapter 3** covers **The Survey Sample and Response** and details how the sample for the survey was constructed, the pattern of response to the survey, any potential biases, and the results of a non-response analysis.
- **Chapter 4** examines the evidence from the survey relating to the **National Training Targets,** such as the targets for adults, and the targets for organisations.
- **Chapter 5** covers a range of **Skills, Recruitment and Training Issues**, in terms of subsectors of the pharmaceutical sector and in terms of educational levels.
- **Chapter 6** deals with **Other Training Issues**, such as barriers to training and non-pharmaceutical specific training.
- **Chapter 7** examines the available evidence of **The Regional Dimension** of the pharmaceutical and biopharmaceutical sector and its skills and training issues.

- **Chapter 8** uses data from HESA to examine how the **Higher Education Output** relates to the sector.
- **Chapter 9** contains the **Summary and Conclusions.**

2. Structure of the Sector

2.1 Definition of the sector

As with all labour markets studies, defining the group, occupations, or sector of interest, are very important. This is particularly problematic in this case. The remit of the Pharmaceutical Industry National Training Organisation (PhINTO) differs from what is commonly thought of as the pharmaceutical and bio-pharmaceutical industry, and is also different from the statistical definition of the pharmaceutical industry. This made creating a sample frame difficult and made the idea of a stratified sample impossible.

The PhINTO definition of the pharmaceutical industry largely reflects the membership and remits of the following trade organisations:

- the Association of the British Pharmaceutical Industry (ABPI)
- the Proprietary Association of Great Britain (PAGB)
- the British In-Vitro Diagnostics Association (BIVDA)
- parts of the remit of The Biotechnology Industry Association
- parts of the remit of the Chemical Industry Association (CIA).

Essentially, the remit includes organisations involved in the research, development, testing, patenting, manufacturing and marketing of pharmaceuticals and bio-pharmaceuticals (Over the Counter, Ethical, and Proprietary medicines), medically orientated biotechnology, medical diagnostics kits, fine chemicals and pharmaceutical precursors. The remit includes sales-only subsidiaries of non-UK based manufacturers, but excludes pharmaceutical wholesalers and retailers.

Unfortunately, this definition does not map completely onto any existing data definitions or data sources. This created some problems developing a sample frame.

2.2 Data sources

There are three main official data sources that cover part of the remit of PhINTO:

- the Annual Employment Survey (AES)
- surveys of business enterprise research and development (R&D)
- the Higher Education Statistics Agency's (HESA) First Destinations Data on full-time higher education graduates.

There are other official data sources, but their size and scope mean that they provided little useful information for this study. The first two sources are examined in this chapter, while the HESA data (given its particular value) is examined separately in Chapter 8. There is also a range of unofficial data sources and these are covered in Chapter 3 as they were used to construct the survey sample.

2.3 Annual employment survey data

The Annual Employment Survey (AES), as the name suggests, is an annual sample survey carried out by the Office of National Statistics (ONS) of the numbers of people in employment by sector and region. The survey sample is based on establishments with PAYE schemes or registered for VAT, and as such excludes the self-employed. The survey samples around 450,000 local units, covering about one-third of the work-sites in the UK. This size of sample means that the survey generates very reliable estimates of the number of establishments and their size, by very localised areas. The bulk of the data is confidential and IES had to apply for a special Chancellor of the Exchequer's Notice to access the data. The data presented here on the pharmaceutical sector has been deliberately aggregated up to avoid the release of any potentially confidential data.

The AES uses the Standard Industrial Classification (SIC) to classify sectors. The SIC has a category 24.4 'Manufacture of pharmaceuticals, medicinal chemicals and botanical products', which on the surface would appear to map closely onto the remit of PhINTO. However, this includes 24.42/2 'Manufacture of non-medicaments', which includes manufacturers of dental fillings and medical gauze and bandages. As data at the level of 24.42/2 is not available it is not clear what impact their inclusion has. Equally, many pharmaceutical Research and Development (R&D) establishments would be recorded under SIC 73.10 along with other science and engineering R&D establishments. The overall impact of these problems means that the AES data for pharmaceutical manufacturers probably reflects the total numbers within the PhINTO remit, but overemphasises the smaller establishments (see Annex C for a more detailed discussion). Despite these problems, these data do represent the most useful and up-to-date data on establishment size and geographical distribution.

Table 2.1: Number of employment units, by size, for pharmaceuticals and all sectors

No. of employees	Pharmaceutical units		All sectors units	
	N	%	N	%
1-10	424	58.2	1,676,551	83.6
10-49	144	19.8	256,377	12.8
50-199	87	11.9	57,955	2.9
200-499	45	6.2	10,169	0.5
500-999	20	2.7	2,283	0.1
1,000+	9	1.2	1,160	0.1
Total	*729*	*100.0*	*2,004,495*	*100.0*

Source: Annual Employment Survey, 1997

Table 2.1 shows the breakdown of establishment size within the pharmaceutical sector and compares this with the data for all sectors.

This shows that nearly 60 per cent of pharmaceutical establishments, as defined by SIC 24.4, have between one and ten employees. This is less than the pattern for all sectors, but is greater than manufacturing in general. Small shops bring the average size of service establishment down, while manufacturing establishments are generally larger.

These small pharmaceutical establishments pose a problem for surveys of this type as they are less likely to be found in the databases used to construct samples. They are also less likely to respond to surveys. This concentration in small units means that overall, nine out of ten (89.9 per cent) establishments have fewer than 200 employees.

If the pattern is examined in terms of the number of employees, as in Table 2.2, the impact of the larger pharmaceutical establishments becomes more apparent. This shows that despite

Table 2.2: Number of employees, by size, of unit for pharmaceuticals and all sectors

Size of unit	Pharmaceutical units		All sectors units	
	Employees	%	Employees	%
1-10	1,341	2.5	4,640,651	20.6
10-49	3,639	6.7	5,684,820	25.2
50-199	8,740	16.0	5,298,507	23.5
200-499	14,770	27.0	3,063,145	13.6
500-999	13,084	23.9	1,542,321	6.8
1,000+	13,129	24.0	2,301,579	10.2
Total	*54,703*	*100.0*	*22,531,023*	*100.0*

Source: Annual Employment Survey, 1997

Table 2.3: Number of employment units, by size, for pharmaceutical sub-classes, 1997

No. of employees	Units manufacturing basic pharmaceutical products		Units manufacturing pharmaceutical preparations	
	N	%	N	%
1-10	173	69.5	251	52.3
10-49	37	14.9	107	22.3
50-199	24	9.6	63	13.1
200-499	12	4.8	33	6.9
500-999	2	0.8	18	3.8
1,000+	1	0.4	8	1.7
Total	*249*	*100.0*	*480*	*100.0*

Source: Annual Employment Survey, 1997

the large number of establishments with less than 50 employees, they only account for 9.2 per cent of pharmaceutical units. This compares with the 45.8 per cent of all employees that are found in establishments of the same size. This also means that nearly half (47.9 per cent) of all pharmaceutical employment is found in establishments of over 500 employees.

It is possible to get data that breaks the SIC class 24.4 into its two component sub-classes. The first of these sub-classes is 'Manufacture of basic pharmaceutical products', while the second is 'Manufacture of pharmaceutical preparations'. (See Annex C for detailed definitions of these sub-classes.) Table 2.3 gives the number of establishments, by establishment size, for these two sub-classes. The size bands have had to be aggregated at the larger end of the scale to maintain confidentiality. This shows that 69.5 per cent of units manufacturing basic pharmaceutical products have less than ten employees. This compares with 52.3 per cent of units manufacturing pharmaceutical preparations.

Table 2.4 shows the impact of the smaller units that manufacture basic pharmaceutical products, as there are 33.4 per cent of employees in units employing fewer than 50 employees. This compares with the 23.2 per cent of employees of pharmaceutical preparation manufacturing units in units with less than 50 employees.

2.4 R&D data

Another useful source of data on the pharmaceutical industry is the regular series of R&D surveys. These surveys examine the pattern of R&D expenditure and employment and are conducted by the Office of National Statistics (ONS).

Table 2.4: Number of employees, by unit size, for pharmaceutical sub-classes, 1997

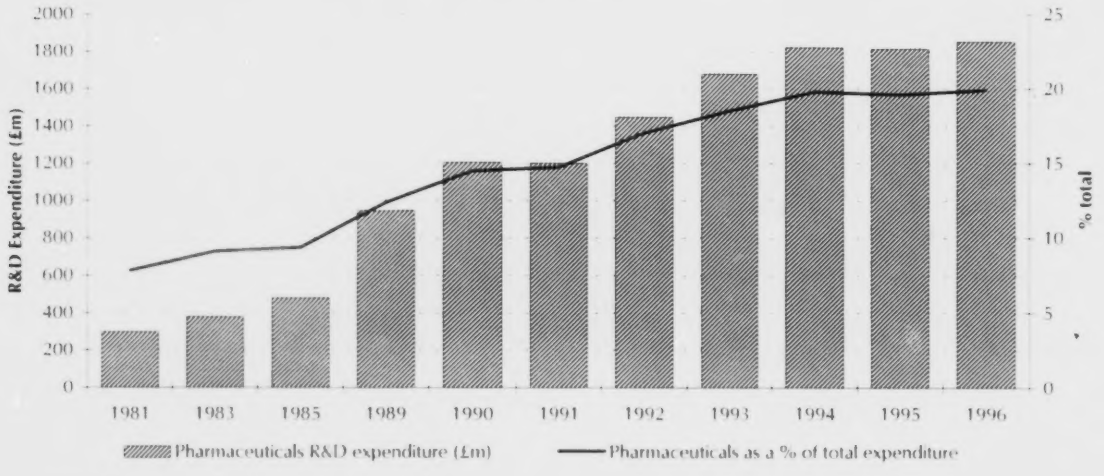
No. of employees	Units manufacturing basic pharmaceutical products		Units manufacturing pharmaceutical preparations	
	N	%	N	%
1-10	471	4.5	870	2.0
11-49	905	8.7	2,734	6.2
50-199	2,113	20.2	6,627	15.0
200-499	4,010	38.4	10,760	24.3
500+	2,951	28.2	23,262	52.6
Total	*10,450*	*100.0*	*44,253*	*100.0*

Source: Annual Employment Survey, 1997

Figure 2.1 shows the annual spend on pharmaceutical R&D as well as the proportion of total UK R&D spend that this represents. Pharmaceutical R&D spend has increased from about £300 million in 1981 to just over £1,800 million in 1996. This represents an increase of over 500 per cent. While some of this increase can be accounted for by inflation, the proportion of total UK R&D spending by the pharmaceutical sector rose from 7.5 per cent in 1981 to about 20 per cent in 1996.

Another measure of the success of the UK's pharmaceutical R&D is the proportion of R&D spend that comes from outside the UK. Table 2.5 presents information on the source of funds for pharmaceutical R&D for 1996. In a similar pattern to all UK R&D spend, 21.4 per cent of pharmaceutical R&D spend came from overseas sources. A far smaller proportion came from government sources and a larger proportion (77.4 per cent) came from the performing organisations' own funds.

Figure 2.1: UK Pharmaceutical R&D spend and as a percentage of total spend



Source: IES/ONS (1998), Survey of Business Enterprise R&D 1996

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Table 2.5: Source of funds for pharmaceutical and all UK R&D, 1996

	Pharmaceuticals		Total	
	N	%	N	%
UK Government	1	0.1	885	9.5
Overseas	397	21.4	2,010	21.6
Own funds	1,434	77.4	5,649	60.7
Other UK business	19	1.0	756	8.1
Total expenditure	*1,852*	*100.0*	*9,301*	*100.0*

Source: IES/ONS (1998), Survey of Business Enterprise R&D 1996

Table 2.6 (below) presents data on R&D employment. This shows that pharmaceutical R&D accounted for approximately 19,000 employees, compared with 139,000 in all R&D. Pharmaceutical R&D employment also tends to have a greater proportion of administrative and clerical support than the rest of R&D employment.

2.5 Other official data sources

The Labour Force Survey, which is normally a very useful source when examining skills and training issues, is unfortunately not of use to this study. This is because the LFS is a sample survey and the numbers employed in the pharmaceutical sector fall below the reliability threshold.

Another official source of data is the Higher Education Statistics Agency (HESA). They collate first destinations data for full-time graduates of higher education. Since one of the variables is *sector of employment*, we obtained data on all those who entered the pharmaceutical sector. This means that we have data on new graduates entering the sector in terms of the level and subjects they studied and the occupations they went into. This data is examined in detail in Chapter 8.

Table 2.6: UK R&D employment for pharmaceuticals and all UK R&D, 1996

		R&D employment	Scientists and engineers	Technicians and laboratory assistants	Administrative clerical and others
Pharmaceuticals	(1,000s)	19	10	4	4
	%	*100.0*	*52.6*	*21.1*	*21.1*
Total	(1,000s)	139	80	32	26
	%	*100.0*	*57.6*	*23.0*	*18.7*

Source: IES/ONS (1998), Survey of Business Enterprise R&D 1996

3. The Survey Sample and Response

This chapter details the process of the sample construction and the nature of the response to the survey.

3.1 The sample

Given the scope of PhINTO's remit, and its relationship with official data definitions, it was necessary to construct our own sample for the survey.

3.1.1 Data sources

Companies were identified from a wide range of sources:

- trade organisations membership lists, such as:
  - The Association of the British Pharmaceutical Industry (ABPI)
  - British In-Vitro Diagnostics Association (BIVDA)
  - BioIndustry Association (BIA)
  - Proprietary Association of Great Britain.
- trade directories, such as:
  - Kompass
  - The Personnel Manager's Yearbook
  - British National Formulary – manufacturers index
  - MIMMS – manufacturers index
  - The UK Biotechnology Handbook.

Given the wide range of sources, it should be expected that there would be a large degree of overlap between the sources. In practice, this was eliminated by checking both for duplicate names and duplicate postcodes. The postcodes check was designed to identify companies that had changed their name, but continued to trade from the same premises. We also approached the human resource directors of the larger pharmaceutical companies, via the ABPI, to identify appropriate respondents from their various business units.

3.1.2 Obtaining named respondents

Named addresses for employer surveys has been shown to increase response rates. Therefore, some effort was spent in obtaining named individuals for each organisation. Some of the sources gave details of the human resource directors or personnel managers and these details were included in the database. In practice, these were found to be somewhat dated. For the other organisations we contacted the companies and asked the switchboard to identify the most appropriate respondent.

The use of all these sources led to the collection of 493 company addresses. Of these we had named respondents for 422 companies, and for the remaining 71 companies we were told it was company policy not to release employees' names.

3.1.3 Sample composition

The absence of a definitive sample frame of pharmaceutical companies led to the method adopted for constructing the frame. It is very likely that the sample was biased in terms of larger more established companies, as these are more likely to feature in the various source lists used. Despite efforts to avoid them, the sample frame also contained a number of inappropriate organisations. Some of the inappropriate organisations were pharmaceutical wholesalers, medical equipment suppliers, cosmetics manufacturers, or companies which had ceased trading.

3.2 Survey dates

The initial mailing of 493 questionnaires went out on 29 April with a covering letter from Dr Bill Proudlock, the Chairman of PhINTO. This was followed up with a reminder to non-respondents from IES on 21 May. The final reminder to non-respondents was sent from IES on 8 June. In total, this generated a response of 148 completed questionnaires by 30 July when the survey was closed.

3.3 Response rate

Overall the response rate was 33.2 per cent. This is slightly lower than would be expected. However, a range of factors can partially explain the low response rate. These include:

- a spate of mergers or impending mergers in the sector leading to very busy HR departments (this was mentioned by a number of non-respondents)
- the large number of very small companies in the sector, and the sample frame, for whom the exercise appeared less relevant

Table 3.1: The pattern of response, by named and unnamed addressees

	Named	Unnamed	Both
Completed responses	126	17	143
No response	240	48	288
Inappropriate	44	2	46
Non-participant	12	4	16
Total mailed out	422	71	493
Base	366	65	431
Response rate	34.4%	26.2%	33.2%

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

- a relatively short time in the field (ten weeks)
- the turbulence of the sector: some of the names obtained from databases, rather than by direct contact were out of date, as people had moved on, or the firm had ceased to exist, or had been taken over.

Table 3.1 gives details of the pattern of response and breaks it down for those we had names for and those we did not have names for. This shows that, as expected, we obtained a higher response from those we had named recipients. This was partly because we got more responses indicating that either they felt the questionnaire was inappropriate for them or that they were unable to respond for some other reason. We also received five further responses from questionnaires that were distributed via the ABPI's manufacturing committee, making a total usable response of 148 questionnaires.

3.4 Response by size

Table 3.2 analyses the response by size and compares this with the size of units found in the Annual Employment Survey for SIC code 24.4. This shows that the size distribution of the survey response is biased towards the larger units. There are a number of factors that explain this pattern:

- as already mentioned, the method of developing the sample frame was biased towards the larger organisations
- equally, smaller organisations are less likely to answer surveys of this type, partially because they are too busy and partially as they consider the issues not to be relevant to them
- a number of non-respondents indicated that they had passed the survey up to 'head-office'. Equally, a number of respondents answered on behalf of multi-establishment organisations.

All of these factors would have tended to increase the response from large establishments. The survey technically got a 100 per

Table 3.2: Size of respondents compared with AES population data

No. of employees	Survey response		AES 1997 units	
	N	%	N	%
1-10	24	16.3	424	58.2
11-49	42	28.6	144	19.8
50-199	33	22.4	87	11.9
200-499	25	17.0	45	6.2
500-999	13	8.8	20	2.7
1,000+	10	6.8	9	1.2
Total	*147*	*100.0*	*729*	*100.0*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

cent response from establishments with more than 1,000 employees. This suggests that the last factor was probably important, with some of the larger responses covering more than one establishment.

Unfortunately, it was not possible to stratify the sample, as often we did not know the establishment or unit size prior to the survey. This, in turn, means that it is not possible to weight the response to better reflect the population. This differential response needs to be taken into account when examining the data presented. The main break variable that is used in the presentation of the analysis is therefore size of responding organisation.

3.5 Response by type of establishment

Half the responses came from a whole organisation. This is partially due to the large number of small organisations in the sample and the response. A further 39.2 per cent of respondents were subsidiaries of non-UK companies, either sales-only subsidiaries (17.6 per cent) or research only subsidiaries (21.6 per cent).

Table 3.3: Response by type of organisation

	Frequency	%
Whole organisation	74	50.0
Part of larger UK company	9	6.1
Subsidiary of UK company	7	4.7
Sales-only subsidiary of non-UK company	26	17.6
Research subsidiary of non-UK company	32	21.6
Total	*148*	*100.0*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 3.4: Response, by parent nationality of organisation and size

No. of employees	UK parent		Non-UK parent		Total	
	N	%	N	%	N	%
1-10	18	20.0	6	10.5	24	16.3
11-49	26	28.9	16	28.1	42	28.6
50-199	22	24.4	11	19.3	33	22.4
200-499	10	11.1	15	26.3	25	17.0
500-999	7	7.8	6	10.5	13	8.8
1,000+	7	7.8	3	5.3	10	6.8
Total	*90*	*100.0*	*57*	*100.0*	*147*	*100.0*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 3.4 examines the size distribution of respondents in terms of their parents' nationality. This shows that non-UK parented responders tended to be larger than UK parented responders. In part this reflects the number of very small UK based start-up companies operating in the sector at the moment.

3.6 Response by sub-sector

The questionnaire asked for the organisations to identify all the pharmaceutical industry activities, or sub-sectors, that they were involved with. Table 3.5 gives the number of times each activity or sub-sector was mentioned, as well as the percentage in terms of all responses and in terms of the number of individual respondents. Nearly two-thirds (64.9 per cent) of responding

Table 3.5: Response by pharmaceutical sub-sector or activity

	Count	% of Responses	% of Cases
Sales and marketing	96	14.8	64.9
Registration and regulatory	85	13.1	57.4
Pre-registration trials	65	10.0	43.9
Quality assurance	64	9.9	43.2
Pre-clinical development	53	8.2	35.8
Production of ethical products	51	7.9	34.5
IT computing	46	7.1	31.1
Post-registration trials and marketing	45	6.9	30.4
Drug discovery; research	41	6.3	27.7
Primary production	37	5.7	25.0
Patenting	35	5.4	23.6
Production of OTC products	30	4.6	20.3
Total	*648*	*100.0*	*437.8*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

organisations were involved to some extent with sales and marketing. To some extent this reflects the nature of the sector and the relatively large number of sales-only subsidiaries of non-UK based companies. Sales was usually linked to registration and regulatory issues, which was mentioned by 57.4 per cent of respondents. Both of these activities were also the most often mentioned in terms of responses, representing 14.8 per cent and 13.1 per cent of responses respectively.

3.7 Sub-sector and size

When the sub-sectors or activities that organisations are engaged in were examined by size (Table 3.6) some important patterns emerged. The larger organisations dominated a cluster of activities that were often found in conjunction with each other. These were:

- post-registration clinical trails and marketing studies
- quality assurance
- primary production
- production of ethical and laboratory products
- production of over the counter products, and
- IT, computing.

'Quality assurance' was linked with the production functions, while it appears that post-registration clinical trails and

Table 3.6: Sub-sectors or activities by organisation size

	1-199		200+		All sizes
	N	%	N	%	N
Drug discovery; research	27	27.3	14	29.2	41
Pre-clinical development	29	29.3	24	50.0	53
Pre-registration trials	36	36.4	18	37.5	54
Post-registration trials and marketing studies	21	21.2	23	47.9	44
Quality assurance	31	31.3	32	66.7	63
Primary production	16	16.2	20	41.7	36
Production of ethical products	24	24.2	26	54.2	50
Production of OTC products	14	14.1	16	33.3	30
Patenting	21	21.2	13	27.1	34
Registration and regulatory	53	53.5	31	64.6	84
Sales and marketing	65	65.7	30	62.5	95
IT computing	16	16.2	29	60.4	45
Total	*99*	*100.0*	*48*	*100.0*	*147*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

marketing studies, as well as IT and computing become more important with the size of organisation.

Smaller organisations tended to dominate the following:

- drug discovery; research
- patenting
- registration and regulatory, and
- sales and marketing.

In practice, the first three are clustered and are typified by the R&D based start-up, while the small sales and marketing organisations tend to be sales-only subsidiaries of non-UK based companies.

3.8 Non-responders

Given the relatively low response rate, a follow-up telephone survey was conducted to examine the reasons for non-response. Eighty organisations out of 122 approached were able to give us a reason why the questionnaires were not returned. The commonest explanation was some form of 'too busy'. This was mentioned by 37.5 per cent of non-respondents. Some companies reported receiving large numbers of questionnaires which, if they were not from the government or from an organisation to which they subscribed, were put straight in the bin. Another problem that emerged was that even if the mechanics of completing the questionnaire would not have taken a long time, researching the answers would have.

The second most common problem was that we had obtained either the wrong name or wrong address from some of the databases. In part, this reflected the dynamic nature of the sector with people and organisations changing their locations. In part, it is also a problem with some of the databases that were used. The database problems also were partially behind the number of

Table 3.7: Details of the non-response analysis

	Responses	%
Too busy	30	37.5
Wrong person/address	18	22.5
Inappropriate to company	10	12.5
Don't know	9	11.25
Staff leave	6	7.5
Delays collecting data	4	5.0
Closed/closing down	3	3.75
Total:	*80*	*100*

Source: IES Survey

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organisations who felt that the survey was inappropriate to them, either because they felt the survey was aimed at companies researching and producing, compared with their sales functions, or because they felt they were very small.

Two further reasons, 'staff leave' and 'delays collecting data', relate to the length of time the survey was in the field. For future surveys it might be advisable to keep the survey in the field for longer and use a final round of telephone reminders.

4. National Training Targets

4.1 The National targets

Part of the remit for NTOs is to set sector targets whereby the following National targets are achieved:

- 50 per cent of adults to have at least an NVQ level 3 qualification
- 28 per cent of adults to have at least an NVQ level 4 qualification
- 45 per cent of medium sized or large organisations to be recognised as Investors in People (IiP)
- 10,000 small organisations to be recognised as Investors in People (IiP).

4.2 Investors in People (IiP)

Two of the National Training Targets concern Investment in People recognition. These targets are also referred to as the targets for organisations. Table 4.1 details the IiP recognition among the pharmaceutical organisations responding to this survey, broken down by size of organisation. IiP recognition had been achieved by 20.6 per cent of responding organisations, and

Table 4.1: IiP recognition within the pharmaceutical industry, by size of organisation

No. of employees	IiP recognised	Not recognised	Not going for re-recognition	Total
1-10	4.8	81.0	14.3	21
11-49	14.3	68.6	17.1	35
50-199	17.2	79.3	3.4	29
200-499	37.5	58.3	4.2	24
500-999	16.7	83.3	0.0	12
1,000 plus	50.0	50.0	0.0	9
Total	*20.6*	*71.0*	*8.4*	*131*
Medium & large organisations total (200 plus)	35.6	64.4	2.2	45

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

71.0 per cent were not recognised, with a further 8.4 per cent not going for re-recognition. Recognition was lowest amongst very small (one to ten employees) and small organisations (11 to 49 employees) at 4.8 and 14.3 per cent respectively. The highest levels of IiP recognition were found in organisations employing 200 to 499 people, at 37.5 per cent, whilst recognition amongst responding organisations with 50 to 199 and 500 to 999 organisations was between 14.3 and 20 per cent.

From this data it would appear that the pharmaceutical sector is not yet reaching the IiP targets for 2002. Thirty-six per cent of large organisations, *ie* those with 200 or more employees, currently have IiP recognition, nine per cent short of the national target of 45 per cent. There is plenty of scope for improvement though, as almost all of the remaining large organisations have not yet been recognised, with less than three per cent having decided not to go for re-recognition.

The target of 10,000 organisations with between ten and 50 employees, recognised by IiP implies that about four per cent of establishments of this size will be recognised. The small organisations within the pharmaceutical sector are significantly less likely (at 14.3 per cent) to be recognised than the larger ones (at 28.0 per cent). However, the smaller pharmaceutical establishments are recognised at over three times the level implicit in the target. This is despite many questionnaire comments that IiP is inappropriate for small organisations. For some, the business case for putting management time into quality certification, such as ISO 6000, was greater. Despite this, given the large number of small establishments in the pharmaceutical sector, the problems of organisations of this size will be very important overall.

Relatively high proportions (17.1 per cent) of small organisations were opting not to go for re-recognition, and hence the pool from which to recruit organisations to the IiP scheme may be diminishing. Organisations who reported that they were not going for re-recognition had been through the IiP process and achieved recognition. However, in retrospect they had decided that the benefits to their organisations did not justify the extra efforts incurred. Particularly in small organisations and new start-up companies, this can be exacerbated due to the day-to-day running of the company taking priority over more strategic developments, such as IiP involvement. These assertions were supported by some of the questionnaire comments:

> *'Workload at the moment means the resources and effort in re-applying for re-recognition is not available currently.'*

> *'The company entered the first phase and saw no benefit.'*

Since the proportions opting not to go for re-recognition were so much higher amongst small responding organisations than medium sized and large respondents, this reinforces the view

that IiP was problematic for organisations of this size. A number of telephone interviews were carried out to further inform the results from the questionnaire survey. These indicated that small firms find IiP either too time consuming, given the size of their organisation, or inapplicable due to the way their organisation works and develops its employees:

> *'When you're very small, you don't have time for the things that big companies do. You don't need them and you don't have time for them.'*

> *'The time it would take to apply, and the expense puts me off. We're already quite stretched with people doing two or three people's jobs, we just can't take time out for it.'*

In addition, there may be a perception that IiP is particularly inappropriate to high-tech organisations, due to the presumption that IiP is only for those with low level qualifications and is less suitable and worthwhile for workforces who are already highly skilled. Some of the telephone interviews also hinted at this:

> *'In the pharmaceutical industry, training is ongoing, we're always going to seminars or courses, and some of us are still studying. We are investors in people, but it's done on an individual basis. As we are already a very skilled workforce, IiP wouldn't necessarily cover what we need for our training. We tend to choose specific courses which are targeted to what we need.'*

It also seemed that some organisations did not know enough about IiP to be able to decide whether it might be suitable for them:

> *'I have never had any information about it, I don't know what it would do for our business.'*

> *'I don't really know enough about it, I was only exposed to it on my IPD course, it sounded quite interesting but I've heard nothing about it since.'*

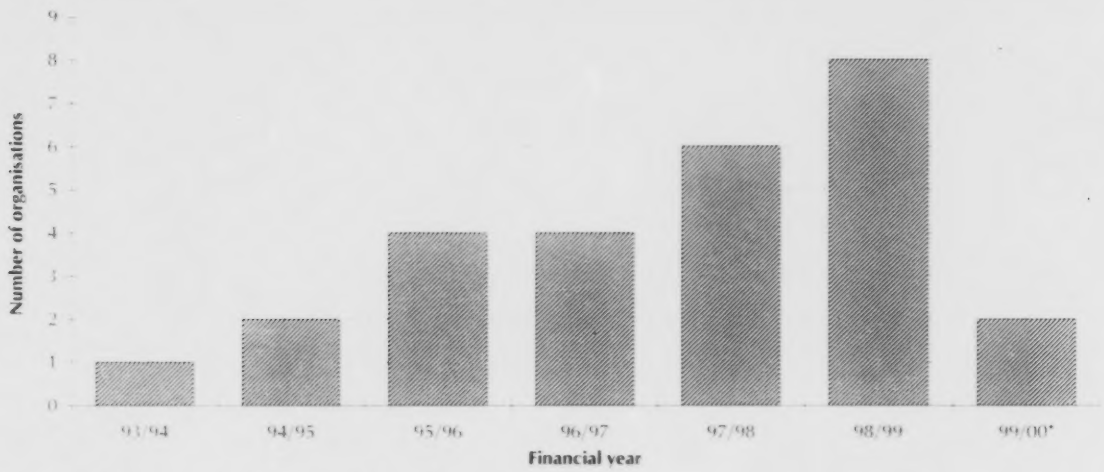
Respondents were asked for ways in which they thought IiP could be made more attractive to small organisations. A major problem seemed to be that small organisations found it difficult to bear the time and costs that IiP involved due to the level of bureaucracy:

> *'It's incredibly bureaucratic. If there was less paperwork and red tape then I think more people would go for it. The documentation and assessment takes so much time, and we also have a business to run. We were spending a day a week on it and we thought, is this going to drive the business forward? It just took up too much time.'*

It was suggested that this problem of the extra work that IiP created for small organisations could be eased if help from outside was available:

> *'We'd need help from the Department of Trade and Industry, or local enterprises. People to come into a company to provide real manpower to go through systems and procedures, we need more external support.'*

Figure 4.1: Organisations in the pharmaceutical industry receiving IiP recognition, by financial year



* 1999/2000 data incomplete due to mid-year collection

Source: IES/PhINTO 'Skills for a competitive future' survey, 1999

Looking at IiP involvement over time, achievement of the IiP standard amongst these respondents has tended to rise each financial year since 1993/1994 (Figure 4.1). Numbers are too small to conduct detailed analysis, but numbers of respondents gaining the award have increased from one organisation in 1993/1994, to seven in 1998/1999. Figures for 1999/2000 are as yet incomplete, but two organisations had committed during the first quarter.

IiP award achievement is likely to continue to increase across the pharmaceutical sector over the next few years, as suggested by Figure 4.1. Table 4.2 illustrates the level of responding organisations' formal commitment to IiP, which includes organisations who are still working towards the award but have not yet achieved it. Hence, it is likely to provide insight on future IiP achievement. Twenty-nine per cent of all responding organisations were formally committed to IiP, compared to 21 per cent who actually had the award. Amongst medium sized and large organisations, 37 per cent reported that they were formally committed to IiP. Provided that these organisations actually go on to achieve IiP recognition, the sector will be close to reaching the target of 45 per cent.

Amongst small organisations, the picture is again less optimistic, although interest in IiP does appear to be growing slowly. Almost 18 per cent of small organisations had formally committed to IiP, twice as many as had actually achieved recognition. Nonetheless, this figure is still considerably lower than for the sector as a whole, and particularly when compared to larger organisations. This again suggests that there is a perception amongst small organisations that IiP is simply not suitable for them. This was supported by the questionnaire comments:

Table 4.2: Organisations formally committed to IiP, by size of organisation

No. of employees		Yes	No	Don't know	Total
1-10	N	2	20	0	22
	%	9.1	90.9	0.0	100.0
11-49	N	10	28	4	42
	%	23.8	66.7	9.5	100.0
50-199	N	10	21	2	33
	%	30.3	63.6	6.1	100.0
200-499	N	10	14	1	25
	%	40.0	56.0	4.0	100.0
500-999	N	4	9	0	13
	%	30.8	69.2	0.0	100.0
1,000 plus	N	6	3	1	10
	%	60.0	30.0	10.0	100.0
Total	N	42	95	8	145
	%	29.0	65.5	5.5	100.0
Medium & large organisations total	N	30	47	4	81
	%	37.0	58.0	4.9	100.0

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

> *'Given our size I am not sure we could deliver the IiP programme effectively.'*
>
> *'For a small company we are not convinced that the resources required are justified by the outcome.'*

These views are unsurprising, as national penetration of the IiP standard has been lower amongst smaller organisations at a national level. With regard to IiP, organisational size appears to be a more important factor than sector.

To provide some national context, Table 4.2 and Figure 4.2 show the total UK figures, across all sectors, for IiP recognition and commitment. It illustrates a smooth upward movement in both commitment and recognition of IiP between 1993/1994 and 1999, across all sizes of organisation. Growth in uptake has been fast, particularly for recognitions, which were over 18 times as high in 1998/1999 as they had been in 1993/1994. Formal commitments have risen too, although not by as much, at just over 300 per cent.

The absolute numbers in Table 4.3 indicate a good absolute level of uptake of IiP by SMEs, compared to large organisations. However, in reality this is not the case. As discussed in Chapter 3, SMEs account for the majority of organisations in the UK. Hence, the proportion of SMEs opting to go for IiP status is

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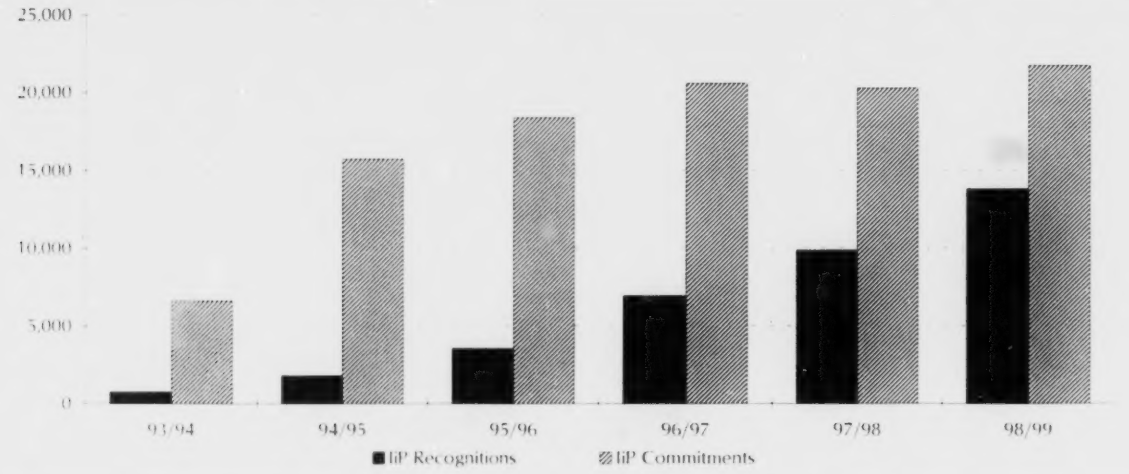
Figure 4.2: All UK IiP Recognitions and Commitments, by year



Source: Investors in People, 1999

actually very low, whilst the proportion of large organisations joining the scheme is far higher. Participation in IiP in the pharmaceutical industry, therefore, mirrors national trends.

Analysis of IiP status was also carried out by type of business unit and most important business activity. However, low numbers made meaningful analysis difficult. Nonetheless, the figures did suggest that units responding on behalf of their whole organisation may have been less likely to be involved in IiP than were units responding on behalf of part of a larger UK company, and to a lesser extent, subsidiaries of non-UK companies. This pattern can be attributed to many of the responding whole organisations being small, and therefore less likely to have formal IiP or lifelong learning involvement, as has been shown above.

Table 4.3: All UK IiP Recognitions and Commitments, by year and organisation size

Financial year	Recognitions				Commitments			
	<50	50-199	200+	All	<50	50-199	200+	All
93/94	483*		258	741		**		6,588
94/95	749	495	514	1,758	7,689	4,105	3,927	15,721
95/96	1,529	1,015	970	3,514	9,037	5,109	4,221	18,367
96/97	2,741	2,329	1,854	6,924	10,057	6,237	4,271	20,565
97/98	3,571	3,664	2,595	9,830	9,680	6,367	4,205	20,252
98/99	5,167	5,132	3,449	13,748	11,074	6,503	4,124	21,701

* These data are not available split into <50 and 50-199 employees
** Only aggregate data available for commitments in 93/94

Source: Investors in People, 1999

4.3 Attainment targets

For comparison, Table 4.4 presents some data for selected sectors calculated on the basis of the numbers of employees covered, rather than in terms of organisations, as the target is couched. Despite this different approach it is clear that the 'Manufacture of chemicals and chemical products' (of which the pharmaceutical industry is a part), at 22.0 per cent has one of the higher recognition levels in the manufacturing sector. The comparable manufacturing sectors are 'Manufacture of food, beverages and tobacco' and 'Manufacture of electrical and optical equipment' which have similar levels of IiP recognition. The sectors with higher levels of recognition are generally those largely in the

Table 4.4: IiP recognition by selected sectors

Selected Sectors	Recognised employees	Sector employment	% recognised *
Manufacture of food, beverages and tobacco	124,170	486,000	25.5
Manufacture of wood and wood products	3,397	86,200	3.9
Manufacture of chemicals, chemical products and fibres	55,284	251,200	22.0
Manufacture of rubber and plastic goods	37,786	242,400	15.6
Manufacture of basic metals and fabricated metal products	56,249	550,200	10.2
Manufacture of machinery and equipment not classified elsewhere	44,018	396,400	11.1
Manufacture of electrical and optical equipment	117,126	531,600	22.0
Electricity, water and gas supply	51,204	144,300	35.5
Sale, maintenance and repair of motor vehicles	27,982	556,700	5.0
Wholesale and commission trade	43,685	1,138,500	3.8
Retail trade	98,147	2,404,200	4.1
Hotels, restaurants and bars	309,361	1,319,900	23.4
Land transport	26,343	481,100	5.5
Air transport	6,391	101,000	6.3
Post and telecommunications	166,564	468,300	35.6
Financial intermediation	222,109	1,027,700	21.6
Computer related activities	21,845	390,700	5.6
Research and development	14,532	93,300	15.6
Public administration, defence and compulsory social security	758,202	1,335,800	56.8
Education	410,063	1,845,100	22.2
Health and social work	446,642	2,536,100	17.6
All sectors	3,741,352	23,829,900	15.7

Note: percentage recognition calculated on the basis of employees rather than organisations

Source: Investors in People (IiP) UK: Sector Penetration Report as at 01/08/99

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Table 4.5: Employees achieving NVQ level 3, level 4, or equivalent

No. of employees	NVQ level 4 plus	NVQ level 3 plus
1-10	69.7	79.5
11-49	63.9	75.7
50-199	54.5	66.4
200-499	60.6	78.9
500-999	43.6	56.7
1,000 plus	54.0	64.1
Total	53.3	65.6

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

public sector, although 'Financial intermediation' has almost the same levels.

The data provided by respondents regarding their employees' highest qualifications suggest that the pharmaceutical sector is, in general, a highly skilled workforce (Table 4.5). These respondents easily exceeded the national attainment targets which have been set. Sixty-four per cent of employees had achieved a minimum of an NVQ level 3 or equivalent, substantially higher than the national target of 50 per cent. The higher level target set was exceeded more dramatically, whilst the national target was that 28 per cent of employees should have at least an NVQ level 4 or equivalent. In fact, these responding organisations had 52 per cent of employees educated or trained to at least this level. The highest levels of attainment were in small organisations, where around two-thirds of the workforce were educated to at least NVQ level 4. Organisations with 200 to 499 employees also had high proportions of qualified staff, although a larger proportion of these qualifications were at NVQ level 3. Larger responding organisations' employees were slightly less well qualified, however, national targets were reached in all size categories (Table 4.5). Hence there may be a case for raising targets slightly within this sector, to account for the high levels of qualifications which already exist.

Employees' qualifications are shown in more detail in Table 4.6. This data reinforces the notion of the pharmaceutical sector as having a highly skilled workforce. Almost one-tenth of responding organisations' employees had PhDs or MDs, with a further six per cent holding Masters degrees or NVQ level 5 equivalents. Another quarter had a first degree, hence well over one-third of these employees had a degree or higher level qualification. It is clear that the small firms in particular have a high concentration of very highly qualified employees, with almost one-fifth of employees of responding organisations with 11 to 49 employees holding a PhD or MD. Almost two-thirds (62 per cent) of employees in responding organisations with one to ten employees. Larger organisations' employees were, in general, slightly less highly qualified. Responding organisations

Table 4.6: Employees' highest qualifications held, by size of organisation

No. of employees	PhDs or MDs	Masters or NVQ level 5	First degree	HNC, HND or NVQ/SVQ level 4	GNVQ, 'A' level or NVQ/SVQ level 3	'O' level, GCSE Grade C or NVQ/SVQ level 2 or below	Total no. of employees	No. of establishments
1-10	11.4	17.4	33.3	7.6	9.8	20.5	132	22
11-49	18.2	7.6	27.1	11.0	11.8	24.3	1,055	38
50-199	11.5	3.1	31.1	8.8	11.8	33.6	3,174	30
200-499	7.9	4.4	39.5	8.8	18.2	21.1	5,409	19
500-999	2.6	0.9	26.1	14.0	13.1	43.3	6,920	12
1,000+	12.7	9.7	19.5	12.1	10.1	35.9	16,211	6
Total	*9.8*	*6.3*	*25.6*	*11.6*	*12.3*	*34.4*	*32,901*	*127*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

with 500 to 999 people had the lowest proportions of very highly qualified staff, and higher proportions of staff with low level or no qualifications, although one-quarter still had a first degree.

4.4 Lifelong learning strategies

Increasing participation in learning is one of the targets within the NTO's remit. Therefore, a section on lifelong learning was included on the questionnaire. The results from this are presented in Table 4.7. Overall, 12 per cent of responding

Table 4.7: Does your organisation or unit have a 'lifelong learning strategy'?, by size of organisation

No. of employees		Yes	No	Not heard of them	Total
1-10	N	1	11	8	20
	%	5.0	55.0	40.0	100.0
11-49	N	3	20	15	38
	%	7.9	52.6	39.5	100.0
50-199	N	1	22	10	33
	%	3.0	66.7	30.3	100.0
200-499	N	7	16	2	25
	%	28.0	64.0	8.0	100.0
500-999	N	2	9	1	12
	%	16.7	75.0	8.3	100.0
1,000+	N	3	3	3	9
	%	33.3	33.3	33.3	100.0
Total	N	*17*	*81*	*39*	*137*
	%	*12.4*	*59.1*	*28.5*	*100.0*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

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organisations had a lifelong learning strategy, 58 per cent reported not having a life learning strategy, and a further 29 per cent admitted that they had not heard of them. Breaking down the data by size of organisation reveals that larger organisations were far more likely to have a lifelong learning strategy, than small organisations. The highest levels were found in organisations with at least 1,000 employees; over one-third had lifelong learning strategies. Respondents with 200 to 499 employees also comprised relatively high levels of organisations with lifelong learning strategies, at 29 per cent. Responding organisations with less than 200 employees were the least likely to have a strategy for lifelong learning — only between three and six per cent did so. Levels of awareness were also low in this area of the sector: between 30 and 45 per cent of small and medium sized organisations (with less than 200 people) had not heard of lifelong learning. More surprisingly, a similar low level of awareness existed amongst the largest organisations responding to the survey (38 per cent).

Some organisations in the sector are well aware of the concept of lifelong learning and many have chosen to include this within the strategic development of their organisations. However, the sector is mixed, both in the levels of organisations with a lifelong learning strategy, and in terms of the proportions of organisations which were aware such strategies existed. Companies that are medium to large in size appear to be engaging more fully in the drive towards a lifelong learning culture than do either the much smaller or the much larger organisations in the sector.

Again, analysis by type of responding unit and by most important area of business resulted in small numbers in the majority of cells. However, it did appear that any patterns that existed, for example, whole organisations being less likely to have formal lifelong learning strategies, were more likely to be due to the large influence of size of organisation, rather than any other factor.

4.5 Study for higher qualifications

Levels of studying for higher qualifications amongst employees within these responding organisations is shown in Table 4.8. The vast majority of employees in all organisations, regardless of size, were not studying for qualifications, or were studying for qualifications below NVQ level 1. Of those studying at a higher level, NVQ level 3 qualifications were the most popular, closely followed by NVQ level 2 qualifications, each accounting for around two per cent of the workforce surveyed. HNC/HND or NVQ level 4 was also relatively popular at almost one and a half per cent. Slightly less than one per cent each were studying for first or higher degrees. Breaking the figures down by size, the absolute levels of training varied somewhat, from 14 per cent in the smallest organisations, to four per cent in organisations with 50 to 100 employees. Studying for higher level qualifications was

Table 4.8: Employees studying for additional higher qualifications, by size of organisation and level of qualification

Size of establishment	PhDs or MDs	Masters or NVQ level 5	First degree	HNC, HND or NVQ/SVQ level 4	GNVQ, 'A' level or NVQ/SVQ level 3	GCSE Grades A to C or NVQ /SVQ level 2 or below	GCSE below Grade C or NVQ/ SVQ level 1	Other lower or no qualifications	Total no. of employees	No. of establishments
1-10	0.9	4.5	4.5	2.7	0.9	0.0	0.0	86.6	112	19
11-49	0.7	2.3	1.9	2.3	1.3	0.8	1.8	88.8	987	34
50-199	0.2	0.9	0.4	0.7	0.8	0.7	0.0	96.4	2,783	25
200-499	0.4	1.5	1.4	1.7	3.5	1.2	0.4	89.8	5,152	20
500-999	0.1	0.6	1.0	2.8	2.3	4.6	0.7	87.9	6,461	11
1,000 plus	0.1	0.4	0.7	0.6	1.4	1.0	0.0	95.7	12,561	4
Total	0.2	0.8	1.0	1.4	1.9	1.8	0.3	92.6	28,056	113

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

most common amongst very small organisations, with one to ten employees, where ten per cent were studying for a first degree, a masters degree or a PhD. Larger organisations tended to have higher levels of employees studying for NVQ level 3 or below, offset by fewer employees studying for qualifications at NVQ level 4 or higher.

It was thought that levels of study amongst organisations' employees might be affected by whether or not they had committed to Investors in People. Table 4.9 shows employees' levels of study, against IiP status. While studying for

Table 4.9: Employees studying for additional higher qualifications, by IiP status

	PhDs or MDs	Masters or NVQ level 5	First degree	HNC, HND or NVQ/SVQ level 4	GNVQ, 'A' level or NVQ/SVQ level 3	GCSE Grades A to C or NVQ/SVQ level 2 or below	GCSE below Grade C or NVQ/ SVQ level 1	Other lower or no qualifications	Total no. of employees	No. of establishments
Recognised as an Investors in People organisation										
Yes	0.1	0.5	0.8	1.7	2.5	2.7	0.4	91.1	12,723	22
No	0.2	1.0	1.2	1.0	1.5	1.2	0.1	93.8	14,236	74
Not going for re-recognition										
	0.2	1.2	0.9	0.9	0.0	0.0	0.0	96.7	646	8
Total	*0.2*	*0.8*	*1.0*	*1.3*	*1.9*	*1.9*	*0.2*	*92.6*	*27,605*	*104*
Committed to Investors in People										
Yes	0.2	0.6	0.9	1.6	3.0	2.9	0.4	90.4	14,702	35
No	0.2	1.1	1.2	1.3	0.8	0.8	0.2	94.3	11,559	74
Don't know	0.0	0.4	0.6	1.1	0.2	0.0	0.0	97.7	1,395	4
Total	*0.2*	*0.8*	*1.0*	*1.4*	*1.9*	*1.8*	*0.3*	*92.6*	*28,413*	*113*

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

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qualifications at NVQ level 4 and below was more common amongst organisations with IiP recognition, studying for degrees and higher qualifications was actually more common amongst those organisations without IiP status. Similarly, those organisations who were opting not to go for IiP re-recognition had slightly higher levels of study at degree level and above than was the case for IiP recognised organisations, or responding organisations as a whole. This can be accounted for, at least in part, due to the effect of size of organisation. Small responding organisations were more likely than larger organisations to have employees who were studying for higher qualifications at degree level and above, whilst also being less likely to be IiP recognised.

In addition, the small organisations in the response were more likely than the large organisations to have opted not to go for re-recognition. Given this, it would seem that IiP does encourage organisations to promote learning at NVQ levels 2, 3 and 4. However, it appears that at present, IiP is not seen to be providing a suitable framework for organisations whose employees tend to be most likely to study at degree level and above.

Patterns of study were also broken down by whether or not the respondent organisations had a lifelong learning strategy, and if they didn't have one, by whether or not one was being planned. The results of this cross tabulation are shown in Tables 4.10 and 4.11. From the survey data, it would appear that having a lifelong learning strategy does increase the proportions of employees who are studying. Almost 17 per cent of employees within responding organisations that had a lifelong learning strategy were studying for additional higher qualifications. NVQ levels 2, 3 and 4 were the most popular, but studying at all levels was higher for this than for other groups. This compares very favourably to organisations without a lifelong learning strategy,

Table 4.10: Employees studying for additional higher qualifications, by Lifelong Learning strategy status

	Yes	No	Not heard of it	Total
PhDs or MDs	0.6	0.1	0.2	0.2
Masters or NVQ level 5	1.6	0.6	0.9	0.8
First degree	1.1	0.9	1.3	1.0
HNC, HND or NVQ/SVQ level 4	3.4	1.0	1.0	1.4
GNVQ, 'A' level or NVQ/SVQ level 3	2.9	2.0	0.6	2.0
GCSE Grades A to C or NVQ/SVQ level 2 or below	6.4	1.3	0.2	2.0
GCSE below Grade C or NVQ/SVQ level 1	0.8	0.2	0.6	0.3
Other lower or no qualifications	83.3	93.9	95.2	92.4
Total no. of employees	3,895	19,441	2,422	25,758
Establishments	13	67	27	107

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 4.11: Organisations without a lifelong learning strategy — employees studying for additional higher qualifications, by whether a lifelong learning strategy is being planned

	Yes	No	Don't Know	Total
PhDs or MDs	0.1	0.1	0.3	0.1
Masters or NVQ level 5	0.5	0.9	0.9	0.7
First degree	0.9	1.2	0.9	1.0
HNC, HND or NVQ/SVQ level 4	0.8	1.0	1.8	1.0
GNVQ, 'A' level or NVQ/SVQ level 3	1.7	1.1	3.7	1.8
GCSE Grades A to C or NVQ/SVQ level 2 or below	1.2	0.6	1.5	1.1
GCSE below Grade C or NVQ/SVQ level 1	0.1	0.3	0.8	0.3
Other lower or no qualifications	94.8	94.8	90.0	94.1
Total no. of employees	14,100	6,151	3,400	23,651
Establishments	12	49	28	89

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

in which only six per cent of employees were pursuing further qualifications. The lowest levels of participation in study for higher qualifications were found in responding organisations that said they had not heard of lifelong learning strategies, at just under five per cent.

There was very little difference in levels of study for higher qualifications between responding organisations who did not currently have a lifelong learning strategy (Table 4.11). Overall, levels of study were the same for those organisations who knew whether they were or were not planning such a strategy, at around five per cent. Surprisingly, this figure was doubled for those organisations which didn't know whether a lifelong learning strategy was planned. Much of this difference was due to the high proportions of employees studying for NVQ level 3 or equivalent (four per cent). Study for NVQ levels 4 and 2 was also more common amongst this group. However, these figures should be approached with caution due to small numbers in some of the cells.

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5. Skills, Recruitment and Training Issues

This chapter examines a range of skills, recruitment and training issues, both by pharmaceutical sub-sector and by the educational attainment of staff.

5.1 Issues by pharmaceutical activities

In practice, industry specific skills and training issues usually only apply to specific activities or sub-sectors of the industry. Therefore, it is necessary to analyse skills and training issues at the activity or sub-sector level. A range of activities which pharmaceutical organisations perform were identified and validated during the piloting of the questionnaire. Respondents were asked:

- whether they undertook these activities or operated in each of these sub-sectors
- how important to their organisation each activity or sub-sector was
- how easy it was to recruit for each activity or sub-sector
- the extent to which each activity or sub-sector generated a training requirement, and
- the ease of delivering training covering the activity or sub-sector.

These issues are covered in turn.

5.1.1 Importance of various pharmaceutical activities

Table 5.1 gives the mean scores of the level of importance to the organisation of a range of activities or sub-sectors. The scores were based on a five point scale where one represented 'unimportant' and five represented 'essential'.

Overall, the most important activity or sub-sector for the respondents was 'Sales and marketing' followed by the linked area of 'Registration and regulatory affairs'. Interestingly, there were no statistically significant differences in the scores on these two activities/sub-sectors by organisation size. This probably reflects the importance attached to them both by the small non-

Table 5.1: Mean importance of pharmaceutical activities, by size

	1-199 employees	200 + employees	Total
Sales and marketing	4.2	4.3	4.2
Registration and regulatory affairs	4.0	4.2	4.0
Quality assurance **	3.4	4.5	3.8
IT computing *	3.4	4.0	3.6
Pre-registration clinical trials	3.2	3.6	3.3
Pre-clinical development; development *	2.8	3.8	3.1
Post-registration trials and marketing *	2.6	3.3	2.8
Production of ethical and laboratory products **	2.2	3.8	2.8
Patenting	2.8	2.5	2.7
Drug discovery; research	2.6	2.8	2.7
Primary production **	2.3	3.4	2.7
Production of OTC products	2.2	2.8	2.4

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

UK based sales-only organisations, and by the larger UK based sales and manufacturing organisations.

However, there was a statistically significant difference between the responses of large and small organisations over the next two most important areas 'Quality assurance' and 'IT, computing'. Here, the larger establishments assigned greater importance to these areas. Similarly, the larger establishments also attached a significantly greater importance to production activities. This probably reflects the functional link between production and quality assurance.

5.1.2 Ease of recruitment

Using a similar five point scale, respondents were asked to score the ease of recruitment in each of the activities. Here the scale went from one: 'very difficult', to five: 'easy'. Therefore the lower the score the greater the recruitment problem. Table 5.2 gives the mean scores by organisation size. The activity with the greatest recruitment problems is 'Patenting' followed by 'Registration and regulatory affairs'. Both of these are highly specialised but not ranked very high in terms of importance. Here, the larger organisations had significantly more problems with recruitment.

There seems to be a particular problem with retention of experienced sales reps, especially in parts of the country where there is a lot of competition. One respondent commented:

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Table 5.2: Ease of recruitment of skills for pharmaceutical activities, by organisation size

	1-199 employees	200 + employees	Total
Primary production **	2.9	3.9	3.3
Sales and marketing	3.3	3.1	3.2
Production of OTC products	3.0	2.5	3.2
Post-registration trials and marketing	3.1	3.2	3.1
Production of ethical products **	2.5	3.6	3.1
Drug discovery; research	3.1	3.0	3.0
Quality assurance *	2.8	3.2	2.9
Pre-registration trials *	2.8	3.1	2.9
Pre-clinical development	2.8	3.0	2.9
IT computing	2.9	2.8	2.9
Registration and regulatory affairs**	3.0	2.4	2.8
Patenting *	2.8	2.2	2.6

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

> *'Being small players, we have had problems attracting skilled reps or keeping the reps we have trained....'*

Others added:

> *'Medical advisers are scarce in the industry. Sales representatives may be recruited with little experience. However, once they have gained experience and training, they are poached by other companies.'*

and:

> *'There is a lack of suitable candidates for sales roles with clinical backgrounds, eg FIBMS qualified individuals who can sell.'*

The next most difficult area for recruitment is 'IT and computing':

> *'Technical roles such as IT , medical information and drug safety are difficult roles to fill with experienced, but not senior, people.'*

The larger organisations find it significantly easier to recruit for 'Production of ethical and laboratory products'. This is presumably because they often have household names. Areas where the smaller organisations found it significantly easier to recruit were 'Patenting' and 'Registration and regulatory affairs'. Here possibly the excitement of a start-up or the chance to mix roles might make the smaller organisations more attractive. However, overall there are not many differences by organisation size, and equally there appear to be relatively little differences between the areas in the ease of recruitment.

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Table 5.3: Gap between ease of recruitment and importance to organisations

	1-199 employees	200 + employees	All sizes
Registration and regulatory	1.3	1.8	1.5
Sales and marketing	1.4	1.6	1.5
Quality assurance	1.3	1.5	1.4
Pre-clinical development	1.2	1.6	1.3
Pre-registration trials	1.3	0.9	1.1
IT computing *	0.8	1.2	1.0
Drug discovery; research	0.8	1.6	1.0
Patenting	1.0	1.1	1.0
Production of ethical products and laboratory products	1.0	0.8	0.9
Primary production	0.6	0.7	0.7
Post-registration trials	0.5	0.5	0.5
Production of OTC products	0.5	0.1	0.4

Note: * statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

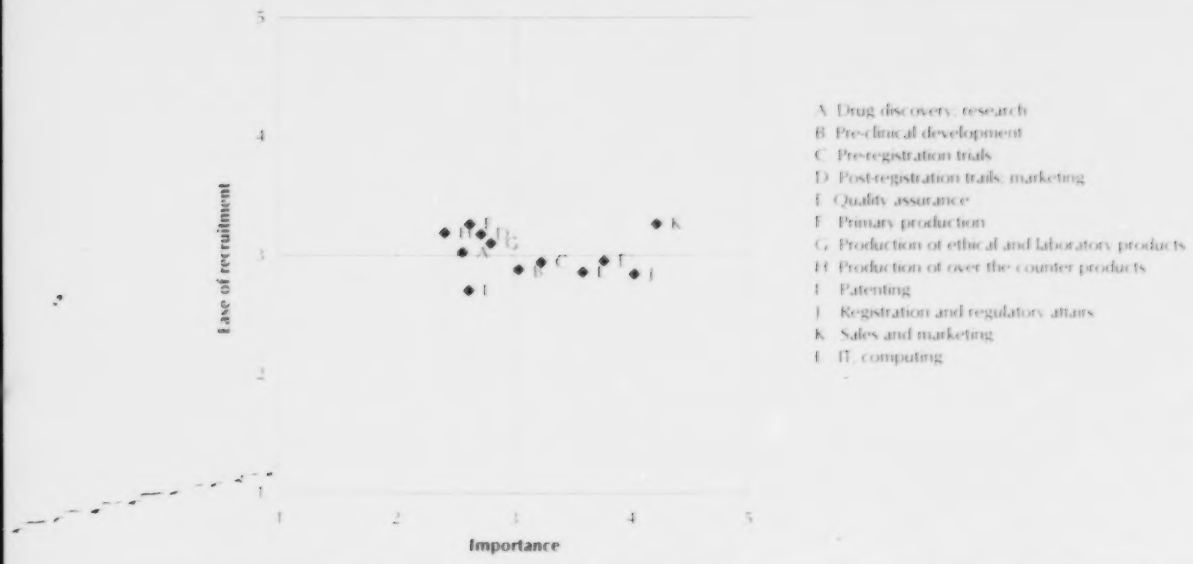
5.1.3 Skills shortages

One measure of skills shortage is the difference between the ranking ascribed to the importance of an area and the difficulty of recruiting for it (Table 5.3). Areas that are important generate a greater gap if there are recruitment problems, than areas that are less important.

In practice the size of the skills 'gap', or difference between importance and difficulty of recruiting, is largely determined by the importance attached to the area. This is because of the relatively small variation between the areas in terms of ease of recruitment.

Another way of looking at the relationship between the importance of areas and the ease of recruitment is graphically, as in Figure 5.1, by plotting the importance of the various areas on the horizontal axis and the ease of recruitment on the vertical axis. Thus, the top right hand quadrant represents 'easy to recruit and important to the organisation', while the bottom left hand quadrant represents 'low importance and hard to recruit'. Importantly, all but one area is in the easy to recruit and high importance category. The exception is 'Production of over the counter products'. This area is relatively easy to recruit for but has the lowest importance of all the areas. The hardest to recruit for, but relatively unimportant, is 'Patenting'. In contrast, the most important area 'Sales and marketing' is one of the easiest to recruit for.

Figure 5.1: Sub-sectors importance to the organisation plotted against the ease of recruitment



Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

5.1.4 Training requirements

Another way of defining skills shortages is in terms of the training requirement that an activity generates. Therefore, a further set of questions asked respondents to indicate their training requirements, using a five point scale, where one represented a 'low training requirement' and five a 'high training requirement'. Table 5.4 presents the mean scores by establishment size, for the extent to which each of the areas generates a training requirement. 'Sales and marketing' as well as 'IT and computing' generate the highest training requirements. Larger organisations have a statistically significant higher training requirement associated with 'IT and computing'. Given the ease with which 'Sales and marketing' staff can be recruited, these high training requirements may reflect a greater need for continuous updating of skills in these areas. 'Quality assurance' also ranked highly in terms of its training requirements, possibly for similar reasons.

'Production of ethical and laboratory products' also generated a significantly greater training requirement in the larger organisations. There was a similar pattern with 'Quality assurance' and 'Primary production' generating higher training requirements in larger organisations. These higher training requirements in larger organisations probably reflect the greater importance they attach to these production functions.

Table 5.4: Training requirement of pharmaceutical activities, by organisation size

	1-199 employees	200 + employees	Total
Sales and marketing	3.6	3.8	3.7
IT and computing **	3.4	3.9	3.6
Quality assurance *	3.3	3.8	3.5
Registration and regulatory affairs	3.3	3.3	3.3
Production of ethical products and laboratory products **	2.2	3.7	2.9
Pre-registration trials	2.7	3.0	2.8
Pre-clinical development	2.6	2.8	2.7
Primary production *	2.3	3.3	2.7
Production of OTC products	2.3	2.8	2.5
Post-registration trials and marketing *	2.3	2.8	2.5
Drug discovery; research	2.5	2.3	2.4
Patenting	2.5	2.0	2.3

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

5.1.5 Ease of delivery of training

A high training requirement that can be simply met, from in-house resources for instance, is less of a problem than a medium training requirement that is difficult to deliver. Therefore, again using a five point scale, respondents were asked to rate the ease of training delivery for each of the areas. Here the scale was one: 'very difficult' to five: 'easy', which means that the lower the mean scores the greater the problem. Table 5.5, below presents the mean scores for ease of training by establishment size.

'Sales and marketing' followed by 'IT and computing' were the easiest activities to deliver training for. In part this may be because these activities are fairly generic, and it should be possible to access materials and courses developed for other sectors covering these areas. However, there are many industry specific aspects to these areas, such as bio-informatics. It may be that the approaches used to train in these areas are generic, even if the specifics are not.

The most difficult activities to deliver training for were the most industry specific: 'Patenting'; 'Drug discovery; research', and 'Pre-clinical development, and development'. However, there were relatively few differences in ease of delivery by size of organisation. There were some greater difficulties around production and 'Quality assurance' amongst the larger companies, reflecting the greater importance they attach to these areas.

Table 5.5: Ease of delivery of skills training for pharmaceutical activities, by organisation size

	1-199 employees	200 + employees	Total
Sales and marketing	3.7	3.8	3.7
IT and computing	3.5	3.4	3.5
Primary production	3.1	3.6	3.4
Production of ethical products and laboratory products *	3.1	3.6	3.4
Quality assurance	3.2	3.5	3.3
Post-registration trials and marketing	3.3	3.2	3.2
Production of OTC products *	2.8	3.5	3.2
Registration and regulatory affairs	3.2	3.3	3.2
Pre-registration trials *	2.9	3.3	3.1
Patenting	3.0	3.1	3.1
Drug discovery; research	3.0	2.7	2.9
Pre-clinical development	3.0	2.9	2.9

Note: * statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 5.6: Importance to organisation of different qualification levels, by organisation size

	1-199 employees	200 + employees	Total
PhDs or MDs	4.0	3.7	3.9
Masters or NVQ level 5	3.3	3.2	3.3
First degree level	4.2	4.3	4.2
HNC, HND or NVQ level 4	3.3	3.3	3.3
'A' levels/GNVQs or NVQ level 3	3.1	3.1	3.1
'O' levels or NVQ level 2 and below	3.0	3.1	3.1

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 5.7: Ease of recruitment of different qualification levels, by organisation size

	1-199 employees	200 + employees	Total
PhDs or MDs	2.6	2.7	2.7
Masters or NVQ level 5	2.8	3.0	2.9
First degree level	3.1	3.6	3.3
HNC, HND or NVQ level 4	3.3	3.5	3.4
'A' levels/GNVQs or NVQ level 3	3.6	3.6	3.6
'O' levels or NVQ level 2 and below	3.9	4.2	4.0

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

5.2 Issues by educational level

Another way of examining skills and recruitment issues is by the expected level of education of the recruit. Much has been written about the problems of recruitment at these different levels, with the sub-degree level often identified as a problem area. A series of questions were included in the questionnaire to examine the pattern in the pharmaceutical industry.

5.2.1 Importance to unit

On the same basis to the questions about sub-sectors, respondents were asked to rate the importance of various levels of educational qualifications, using a five point scale. As with the previous questions the scale ran from one representing 'unimportant' to five representing 'essential'. Table 5.6 presents the mean scores of importance to organisation by establishment size.

Overall, there were no significant differences in the importance to the organisation of the different levels of education, by size of organisation. Consistently, first degrees were rated the most important followed by PhDs and then, relatively close to each other, masters and sub-degree qualifications, such as HNDs.

5.2.2 Ease of recruitment

In terms of ease of recruitment, Table 5.7 presents the mean scores of a five point scale, where one represents 'very difficult' and five represents 'easy'. This shows that the most difficult group to recruit were those with doctoral level qualifications and the easiest were those with sub-degree qualifications like an HND. The only significant difference by size was that larger organisations found it easier to recruit first degree graduates.

The open ended questions suggest that the smaller organisations think that their size means that potential graduate recruits believe that progression will be difficult. For instance:

> *'Small company — lack of avenues for progression.'*

or:

> *'Finding a suitable candidate who will not leave to progress their career following training as promotion within the new company will be slow.'*

5.2.3 Gaps between importance and ease of recruitment

Using the same approach as with the pharmaceutical activities, we have subtracted the ease of recruitment from the importance to get a measure that takes account of both factors. Table 5.8 shows the results of these calculations. It also shows that by far the greatest gap occurs at the PhD, MD doctoral level. By comparison, there is no gap at all in terms of the sub-degree level

Table 5.8: Difference between importance to organisation and ease of recruitment the 'skills gap', by organisation size

	1-199 employees	200 + employees	Total
PhDs or MDs *	1.6	1.1	1.4
Masters or NVQ level 5 b*	0.9	0.3	0.6
First degree level *	1.1	0.8	1.0
HNC, HND or NVQ level 4	0.1	-0.2	0.0
'A' levels/GNVQs or NVQ level 3	-0.5	-0.5	-0.5
'O' levels or NVQ level 2 and below *	-0.8	-1.1	-0.9

Note: * statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

skills. This pattern reflects the pattern of importance and the reported fierce competition to recruit the best PhDs with their new ideas that can lead to new products.

5.2.4 Training requirements

Generally, the lower the level of existing qualifications, the higher the level of training requirements. However, as shown in Table 5.9 the larger firms also generally had a statistically significant greater training requirement at most levels. In part, this pattern may be due to the type of work the lower qualified perform. Both the larger organisations and the lower qualified are more likely to be involved in the production functions, where training is seen as more of an issue.

5.2.5 Ease of delivering training

In terms of the ease of delivering training, there were not many differences either by educational level or by size of organisation. There was a pattern of greater ease towards the lower levels of

Table 5.9: Training requirements of different levels of education, by organisation size

	1-199 employees	200 + employees	Total
PhDs or MDs	2.8	3.1	2.9
Masters or NVQ level 5 *	2.6	3.0	2.8
First degree level **	3.3	3.9	3.5
HNC, HND or NVQ level 4 *	3.3	3.6	3.4
'A' levels/GNVQs or NVQ level 3 *	3.3	3.6	3.4
'O' levels or NVQ level 2 and below	3.5	3.4	3.5

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 5.10: Ease of delivering training different qualification levels, by organisation size

	1-199 employees	200 + employees	Total
PhDs MDs	3.4	3.1	3.3
Masters	3.4	3.3	3.4
First degrees	3.4	3.6	3.5
HNC, HND or NVQ level 4.	3.4	3.6	3.4
'A' levels/GNVQs or NVQ level 3	3.6	3.6	3.6
'O' levels or NVQ level 2 and below	3.6	3.9	3.7

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

existing qualifications, as shown in Table 5.10, but even here the differences were not particularly significant.

6. Other Training Issues

The survey included two further questions relating to training issues, which will be dealt with in turn:

- barriers to training
- non-pharmaceutical industry specific training.

6.1 Barriers to training

Using a one to five scale, where one represented 'does not restrict' and five represented 'major restriction', respondents were asked to indicate the extent to which a range of factors limit the amount of training they undertake. The mean scores for the various potential barriers to training are shown in Table 6.1.

The most important barrier to the amount of training was the cost of external courses. Importantly, costs of external courses were significantly more of a barrier for organisations with fewer than 200 employees. Interestingly, there was also a statistically significant difference by status of the unit. Parts of a larger UK company were less concerned with these costs, than the other types of organisation. Similarly, organisations which were recognised by IiP were significantly less concerned about costs.

Table 6.1: Mean scores on the extent to which factors limit the amount of training, by establishment size

	1-199 employees	200 + employees	All sizes
Releasing people from work *	3.4	3.0	3.2
Cost of external courses **	3.7	3.0	3.5
Quality of external courses	3.0	3.1	3.0
Training set-up costs *	2.6	2.3	2.5
Fees for consultants **	3.6	3.1	3.4
Appropriate identification of training needs	2.6	2.6	2.6
Measuring the effectiveness of training	2.9	2.8	2.8
Lack of sufficiently specific courses	3.1	2.9	3.0

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Another cost issue, the fees for consultants, was the second most important barrier. Again, this was significantly more of a problem for the smaller organisations. The only other factor with a significant difference between the smaller organisations and the larger, was the costs of setting up training systems, although overall this was the least important barrier to greater training.

Costs issues are more likely to be seen as barriers to further training by smaller organisations and those who have not gone down the IiP route. This suggests one method of boosting IiP may be to acknowledge the costs, but show how the benefits outweigh these costs.

6.2 Non-pharmaceutical specific training

There are a wide range generic areas of training that are not specific to the pharmaceutical industry but still represent an important component of the overall training activity in the sector. Therefore, using similar scales (one to five, low requirement to high requirement), questions were asked about these non-pharmaceutical specific types of training. Table 6.2 gives the mean scores, by size of establishment, for the requirement for these types of training.

This shows that overall, induction training was rated with the highest requirement, followed by basic skills training. Interestingly, possibly because of the size and hence complexity of the organisation, these were considered a greater requirement by the larger organisations. Indeed, all the non-pharmaceutical specific training issues, apart from refresher training, were considered to have a significantly higher requirement by the larger organisations.

Equally important is that the mean scores given to these non-pharmaceutical training areas is greater than those given to the pharmaceutical industry specific skills covered in Chapter 5.

Table 6.2: Requirement for non-pharmaceutical specific training

Requirement	1-199 employees	200 + employees	All sizes
Induction training *	4.1	4.6	4.3
Basic skills training *	3.4	3.8	3.6
CPD training *	3.3	3.8	3.5
Management training **	3.6	4.3	3.8
IT training **	3.6	4.2	3.8
Refresher training	3.2	3.4	3.3
Technical training **	3.5	4.0	3.7

Note: ** statistically significant difference at the 1 per cent level
* statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

Table 6.3: Ease of delivery of non-pharmaceutical specific training

	1-199 employees	200 + employees	All sizes
Induction training	4.3	4.2	4.3
Basic skills training	3.9	4.0	3.9
CPD training	3.1	3.3	3.2
Management training *	3.0	3.4	3.2
IT training	3.6	3.7	3.6
Refresher/update training	3.5	3.6	3.5
Technical training	3.4	3.6	3.5

Note: * statistically significant difference at the 10 per cent level

Source: IES/PhINTO, 'Skills for a competitive future' survey, 1999

This suggests that people are recruited primarily for their pharmaceutical specific skills, but that their generic skills such as management are often lacking. This is especially the case amongst the smaller organisations.

Table 6.3 examines the ease of delivery of the non-pharmaceutical specific skills, using the mean scores of a similar five point scale. Here a higher score indicates a greater ease of delivery. Induction training and basic skills training were the easiest to provide, with refresher training and technical training the most difficult. The only statistically significant difference by size of organisation was with management training, which was found to be easier to provide by the larger organisations.

7. The Regional Dimension

The survey received five responses from Scotland and two from Wales. These small numbers make any regional analysis of the survey unfeasible. However, there is regional data available from the Annual Employment Survey (AES) and from the Higher Education Statistics Agency (HESA). The evidence from these sources is examined in this chapter.

7.1 Evidence from the AES

As already mentioned in Chapter 2, the government's Annual Employment Survey (AES) generates estimates of the number of establishments (or units) and employees by sector, size of establishment and region (including Government Office Regions).

Therefore, it is possible to generate Table 7.1 which shows the number of establishments (or units) by size and region. This shows that over one-third (36.5 per cent) of pharmaceutical

Table 7.1: Number of units, by size and government office regions, 1997

	1-199		200+		Total	
	N	%	N	%	N	%
South East	119	86.9	18	13.1	137	18.8
Eastern	67	89.3	8	10.7	75	10.3
London	125	96.9	4	3.1	129	17.7
South West	39	86.7	6	13.3	45	6.2
West Midlands	*	*	*	*	47	6.4
East Midlands	44	91.7	4	8.3	48	6.6
Yorkshire and Humberside	44	88.0	6	12.0	50	6.9
Merseyside	11	84.6	2	15.4	13	1.8
North West	69	90.8	7	9.2	76	10.4
North East	17	73.9	6	26.1	23	3.2
Wales	31	83.8	6	16.2	37	5.1
Scotland	42	85.7	7	14.3	49	6.7
GB	655	*89.8*	*74*	*10.2*	*729*	*100.0*

Note: * Suppressed on confidentiality grounds

Source: Annual Employment Survey, 1997

establishments were in London and the South East. Outside of the Home Counties there were concentrations in the Eastern Government Office Region (10.3 per cent of the total) and the North West (10.4 per cent of the total).

In part, the lack of a survey response from Wales and Scotland can be explained by the low number of units in Wales and Scotland (5.1 and 6.7 per cent of the total respectively). Given a total response of 141, we would therefore have expected seven responses from Wales and nine from Scotland. However, we know that many of the responses from England actually covered a range of establishments from throughout the UK, as questionnaires were, on occasions, passed to headquarters for completion. Thus, some of the data from large units in England may cover establishments in Wales or Scotland.

The North East had the largest percentage of establishments with more than 200 employees (26.1 per cent), although the numbers involved are small. The figure for the whole of Great Britain was 10.2 per cent. On the other hand, London had the greatest percentage of establishments with under 200 employees. This presumably reflects the large number of 'sales-only non-UK based' organisations, as well as headquarters and small R&D establishments. The Eastern, East Midlands and North West regions also had a higher than average concentration of smaller establishments. The Eastern region probably reflects the large number of start-up biotechnology companies around Cambridge.

In terms of employment, as shown in Table 7.2, the South East and London are also very important, with 24.7 per cent and 11.7

Table 7.2: Number of employees, by size and region, 1997

	1-199		200+		Total	
	N	%	N	%	N	%
South East	1,731	12.8	11,754	87.2	13,485	24.7
Eastern	1,434	22.5	4,941	77.5	6,375	11.7
London	1,824	42.0	2,523	58.0	4,347	7.9
South West	679	22.6	2,319	77.4	2,998	5.5
West Midlands	*	*	*	*	1,106	2.0
East Midlands	1,337	45.7	1,588	54.3	2,925	5.3
Yorkshire and Humberside	1,372	31.9	2,934	68.1	4,306	7.9
Merseyside	327	24.9	987	75.1	1,314	2.4
North West	1,299	23.5	4,232	76.5	5,531	10.1
North East	302	7.5	3,731	92.5	4,033	7.4
Wales	1,033	33.6	2,042	66.4	3,075	5.6
Scotland	1,275	24.5	3,932	75.5	5,207	9.5
GB	*13,719*	*25.1*	*40,983*	*74.9*	*54,702*	*100.0*

Note * Suppressed on confidentiality grounds

Source: Annual Employment Survey, 1997

per cent of total employment respectively. Equally, establishments with under 200 employees accounted for just over one-quarter of all GB pharmaceutical employment. In the East Midlands, employment in establishments of less than 200 represented 45.7 per cent and in London 42.0 per cent. However, in the North East 92.5 per cent of employees were in units of over 200 employees.

7.2 Evidence from HESA

The Higher Education Statistics Agency (HESA) collates data on the labour market status of graduates as of December 31st for those who have graduated before October of that year. IES obtained a special tabulation of the data for the academic year 1996/1997 giving the details of those who obtained employment in the Pharmaceutical sector (SIC 24.4). The full details of the HESA data are in Chapter 8, which examines this data source more fully. The regional aspect of the data is examined in this chapter.

Table 7.3 shows the numbers of graduates who entered employment in the Pharmaceutical sector (SIC 24.4), by region and level of qualification. This shows that a total of 299 postgraduates, 973 first-degree graduates and 24 other undergraduates entered the pharmaceutical sector within six months of graduation. It is of course possible that graduates entered the sector after a period of employment in another sector, for instance post-docs, however they are not captured by this HESA data. Equally, although the majority of other undergraduate qualifications are HNDs, these qualifications are more usually gained either part-time or in Further Education Colleges and, as such, lie outside the data collection exercise. However, the data does give a good regional breakdown. This shows that the bulk of first degree graduates entering the pharmaceutical sector were employed in England.

Compared with the pattern of employment from the AES, English pharmaceutical establishments are recruiting a higher proportion of first degree graduates. Scotland is recruiting a

Table 7.3: Region of pharmaceutical employment for recent graduates by level, 1996/97

	Postgraduate		First Degree		Other Undergraduate	
	N	%	N	%	N	%
England	250	83.6	884	90.9	20	83.3
Wales	1	0.3	23	2.4	1	4.2
Scotland	19	6.4	36	3.7	0	0.0
Northern Ireland	11	3.7	25	2.6	3	12.5
UK unknown	18	6.0	29	3.0	0	0.0
UK total	*299*	*100.0*	*973*	*100.0*	*24*	*100.0*

Source: Special Analysis of HESA's First Destination Return 1996/97 for this study

Table 7.4: Occupations of graduates entering the pharmaceutical industry, by region 1996/97

		England	Wales	Scotland	Northern Ireland	UK unknown	UK total
Managers and Administrators	N	104	4	3	3	3	144
	%	11.7	9.5	6.4	4.9	6.0	11.3
Professional Occupations	N	353	19	18	33	21	592
	%	39.8	45.2	38.3	54.1	42.0	46.4
Associate Professional and Technical Occupations	N	163	10	13	12	7	220
	%	18.4	23.8	27.7	19.7	14.0	17.2
Sales Occupations	N	145	5	10	5	9	184
	%	16.4	11.9	21.3	8.2	18.0	14.4
Other Occupations	N	121	4	3	8	10	136
	%	13.7	9.5	6.4	13.1	20.0	10.7
Grand Total	N	886	42	47	61	50	1,276
	%	100.0	100.0	100.0	100.0	100.0	100.0

Source: Special Analysis of HESA's First Destination Return 1996/97

higher proportion of postgraduates. This may reflect the start of a research intensive pharmaceutical industry in Scotland. Conversely, Wales is generally recruiting fewer graduates than its proportion of employment would suggest. This in turn may reflect a less research intensive pharmaceutical industry in Wales.

Examination of the occupations entered by graduates, as in Table 7.4, allows a further characterisation of the regional pharmaceutical industries. Overall, 46.4 per cent of graduates entering the pharmaceutical industry went into professional occupations, with a further 17.2 per cent entering associate professional occupations.

The regional breakdown indicates that Northern Ireland has the highest proportion entering professional occupations at 54.1 per cent, followed by Wales at 45.2 per cent. Scotland had the highest proportion entering sales occupations at 21.3 per cent, and England had the highest proportion entering managerial occupations.

7.3 Locational issues

It is clear from the geographic distribution of respondents, and the comments they made on the questionnaires, that location is an important determinant of recruitment problems. The research establishments prefer to be close to the universities from which they recruit their key researchers. This explains, in part, the large concentration of small start-up, often biotechnology based, companies around Cambridge, Oxford and London universities.

Foreign sales-only subsidiaries are usually based in the Home Counties, often close to Heathrow or Gatwick airports, as well as the centre of London. Some Scottish respondents mentioned the problems of recruiting when they are long way from the core of the UK pharmaceutical industry. Long established large manufacturing plants have developed good relations with their local further and higher educational institutions and these meet most of their lower level training needs. Many of the start-up companies have been set up by former academics, often biological, from universities. These former academics maintain close links with their former universities and obtain most of their higher level recruits from their former departments.

8. Higher Education Output

8.1 HESA's first destinations statistics

The Higher Education Statistics Agency (HESA) collates and publishes data on the first destinations of full-time graduates from higher education institutions. The latest data available, whilst this report was being written, covers graduates from the academic year 1996/1997. The data give details of the labour market status of graduates as of December 31st 1997 and, for those entering employment, data on the sector, and occupations entered. Full details of the data set are contained in the HESA publication, *First Destinations of Students Leaving Higher Education Institutions* (HESA, 1998). As the sectors are coded using SIC, IES obtained a special analysis of the 1996/1997 first destinations returns covering all those entering the pharmaceutical industry (SIC 24.4). This special analysis had information on gender, level of study, the region of employment, occupation entered and the detailed subject of study. The region of employment aspect of the data has been examined in Chapter 7. This chapter examines the gender, level, subject studied and occupation entered, aspects of the data.

8.2 Graduates entering the pharmaceutical industry

Table 8.1 examines the numbers known to have entered the pharmaceutical industry by gender and level of study. This shows that 1,329 new graduates were known to have entered the pharmaceutical sector, of which about three-quarters were first degree graduates and very few other undergraduates.

Table 8.1: Numbers of new graduates from the 1996/97 academic year entering the pharmaceutical sector, by gender

	Postgraduates		First degrees		Other undergraduate	
	N	%	N	%	N	%
Male	161	53.3	454	45.3	10	41.7
Female	141	46.7	549	54.7	14	58.3
Both	302	100.0	1,003	100.0	24	100.0

Source: IES/Special Analysis of HESA's First Destination Return, 1996/97

An important feature of the data is the number of female graduates entering the industry. Over half (53.0 per cent) the entrants were female. At first degree and other undergraduate levels, the proportion rises to 54.7 and 58.3 per cent respectively.

8.3 Implications for the level 4 attainment target

The HESA data indicate that about 1,300 new entrants to the sector have at least an NVQ level 4 qualification. It can also be assumed that the HESA data is an undercount of the actual position for a number of reasons:

- the HESA data only covers graduates in the first six months after they graduate. Graduates can, and presumably do, enter the sector more than six months after graduation.
- the HESA data do not cover post-docs. It is known that this group are particularly liable to set up their own start-up companies and to recruit other post-docs during the initial research led stage.
- this HESA data is probably an undercount, as it does not include those who may have entered the pharmaceutical sector but were recorded as entering an unknown or less specific sector
- the HESA data also do not cover those who obtained their qualifications as a result of part-time study. This is a particularly important mode of study for those obtaining masters and HND/HNC qualifications.
- the bulk of HND/HNCs are awarded by further education colleges who are outside the remit of the HESA data collection exercise.

On the basis of all the above exceptions to the HESA data, it is fairly safe to assume that at least 2,000 people enter the sector every year with level 4 qualifications. This survey suggests that 17,542 out of 33,229 covered by the survey have an NVQ level 4 qualification. If this is grossed up to the population for the sector, from the Annual Employment Survey, this suggests that 28,878 out of a total of 54,703 (or 52.8 per cent) have an NVQ level 4 qualification. However, this is probably an under-estimate as we know that the non-responding, smaller organisations tend to have a higher than average qualification profile.

In this context, an extra 2,000 entrants per year with NVQ level 4 qualifications, represents an annual increase of about three per cent in the percentage qualified to NVQ level 4. However, the entrants are probably replacing a similar number of those leaving the industry, either to other industries or retirement. If half of those leaving, and all of those entering have NVQ level 4 qualifications, this would suggest a net gain for the industry of about 1,000 people with this level of qualification. In percentage terms this is a net annual increase of 1.5 per cent. In turn, this

implies that if this process continues, by the year 2002 approximately 57 per cent of the industry's employees will be qualified to NVQ level 4. This is well above the national target of 28 per cent of adults with a level 4 qualification. Indeed, it is well above the national target of 50 per cent of adults with a level 3 qualification.

8.4 Subject of study of new graduate recruits

Table 8.2 analyses the subject of study of new entrants to the pharmaceutical industry. This shows that four main subjects represent the core of the industry's recruitment. These are:

- subjects allied to medicine (including pharmacology)
- biological sciences
- physical sciences (including chemistry), and
- business and administrative studies.

Table 8.2: First destinations 1996/97: percentages entering the pharmaceutical sector (SIC code 24.4), by subject and level of award

Subject group	Postgraduates		First degrees		Other undergraduate	
	N	%	N	%	N	%
Medicine & dentistry	18	6.0	4	0.4	–	0.0
Subjects allied to medicine	58	19.2	142	14.2	1	4.2
Biological sciences	66	21.9	260	25.9	2	8.3
Veterinary sciences	1	0.3	1	0.1	–	0.0
Agriculture & related subjects	5	1.7	8	0.8	3	12.5
Physical sciences	79	26.2	212	21.1	5	20.8
Mathematical sciences	12	4.0	17	1.7	1	4.2
Computing science	3	1.0	35	3.5	1	4.2
Engineering & technology	10	3.3	60	6.0	1	4.2
Architecture, building & planning	–	0.0	4	0.4	–	0.0
Social economic & political studies	2	0.7	29	2.9	–	0.0
Law	3	1.0	4	0.4	1	4.2
Business & administrative studies	27	8.9	80	8.0	6	25.0
Librarianship & information science	3	1.0	8	0.8	–	0.0
Languages	2	0.7	23	2.3	–	0.0
Humanities	1	0.3	13	1.3	–	0.0
Creative arts & design	–	0.0	6	0.6	1	4.2
Education	9	3.0	1	0.1	–	0.0
Combinations	3	1.0	96	9.6	2	8.3
Total	*302*	*100.0*	*1,003*	*100.0*	*24*	*100.0*

Source: IES/Special Analysis of HESA's First Destination Return, 1996/97

Overall, biology is the largest subject group, representing almost one-quarter (24.7 per cent) of graduate recruits. This compares with the physical sciences, which includes chemistry, which represents 22.3 per cent of the total. This is perhaps important for the self image of an industry that has seen itself in the past as chemistry based, and that is rapidly becoming a biology (or more properly biotechnology) based industry.

The dominance of biology is more clearly seen at the first degree level, where 25.9 per cent of new first degree graduates had studied biology, in comparison with 21.1 per cent studying physical sciences. At the postgraduate level, the importance of pharmacology emerges, with 21.9 per cent having studied subjects allied to medicine. However, also at the postgraduate level, the physical sciences with 26.2 per cent, outweigh the biological sciences with 21.9 per cent.

Another way of examining the subject distribution is to examine the proportion of those entering employment that went into the pharmaceutical sector, as is done in Table 8.3. This shows the

Table 8.3 Percentage of all graduates entering employment entering the pharmaceutical sector, by subjects and level, 1996/97

	Postgraduates	First degrees	Other undergraduate
Medicine & dentistry	3.1	0.1	–
Subjects allied to medicine	8.4	2.1	0.0
Biological sciences	5.4	3.9	2.2
Veterinary sciences	1.8	0.3	–
Agriculture & related subjects	2.0	0.6	0.6
Physical sciences	4.7	3.4	5.0
Mathematical sciences	3.8	0.9	9.1
Computing science	0.3	0.7	0.2
Engineering & technology	0.5	0.6	0.2
Architecture, building & planning	–	0.1	–
Social economic & political studies	0.1	0.3	
Law	1.0	0.2	7.1
Business & administrative studies	1.4	0.6	0.4
Librarianship & information science	0.8	0.4	–
Languages	0.3	0.3	–
Humanities	0.2	0.3	–
Creative arts & design	–	0.1	0.2
Education	0.1	0.0	–
Combinations	1.0	0.8	1.5
Total	*1.1*	*0.9*	*0.2*

Source: IES/Special Analysis of HESA's First Destination Return, 1996/97, and HESA (1998) First Destinations of Students Leaving Higher Education Institutions, 1996/97

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relative demand the sector makes to the output of higher education. Importantly, at no level or subject does the pharmaceutical industry take more than ten per cent of the output. The highest proportion is for mathematical sciences at the other undergraduate level. Here, the demand is probably for statisticians to analyse trials, although it should be realised that this is a small group of only 30 people. The next highest group, where the industry recruits 8.4 per cent of the output that enters employment, is subjects allied to medicine at the postgraduate level. Since this subject group includes pharmacy and pharmacology, this is perhaps to be expected. However, it also brings into relief the comments about the problems many respondents had with recruiting qualified pharmacists. Also, at the postgraduate level, the industry recruited 5.4 per cent of biologists, 4.7 per cent of physical scientists and 3.8 per cent of mathematicians who entered employment. This reflects the greater number of biologists than physical scientists recruited at the first degree level. The industry also recruited a greater proportion of the available output of biologists (3.9 per cent), compared to physical scientists (3.4 per cent). The other subject areas represented such a small proportion of those entering employment that it is unlikely that the sector put any particular stress on the total output.

8.5 Occupations entered by new graduates

The HESA data also allow the broad occupational categories of entrants to be examined. The data are coded using the Standard Occupational Classification (SOC) and obtained at the one digit level. Table 8.4 presents the data on the occupations entered by new graduates going into the pharmaceutical industry. This shows that at all levels the largest occupational group entered were the professional occupations. The professional category includes natural scientists and engineers as well as health professionals. Nearly two-thirds (66.2 per cent) of the postgraduate entrants entered the professional occupations, compared with 39.8 per cent of first degree entrants, and 29.2 per cent of other undergraduate entrants. Postgraduate entrants were also more likely to enter managerial and administrative positions than the others. An important category for all levels, but particularly for first degree graduates, were sales occupations, with 16.4 per cent of first degree entrants in this category.

Table 8.4: Occupations entered by new graduates entering the pharmaceutical sector, 1996/97

	Postgraduate		First degrees		Other undergraduate	
	N	%	N	%	N	%
Managers & Administrators	38	12.6	111	11.1	2	8.3
Professional Occupations	200	66.2	399	39.8	7	29.2
Associate Professional & Technical Occupations	32	10.6	192	19.1	6	25.0
Clerical & Secretarial Occupations	1	0.3	82	8.2	6	25.0
Craft & Related Occupations	–	0.0	5	0.5	–	0.0
Personal & Protective Service Occupations	–	0.0	1	0.1	–	0.0
Sales Occupations	21	7.0	164	16.4	2	8.3
Plant & Machine Operatives	1	0.3	30	3.0	1	4.2
Other Occupations	2	0.7	12	1.2	–	0.0
Unknown	7	2.3	7	0.7	–	0.0
Grand Total	*302*	*100.0*	*1003*	*100.0*	*24*	*100.0*

Source: IES/Special Analysis of HESA's First Destination Return, 1996/97

9. Summary and Recommendations

The Institute for Employment Studies (IES) was commissioned by the Pharmaceutical Industry National Training Organisation (PhINTO) to undertake a survey of skills and training issues in the sector. The primary aim was to develop a sample, and design a questionnaire, to act as the basis for ongoing monitoring of skills and training issues in the pharmaceutical and bio-pharmaceutical industries. The sample aimed to cover as much of the sector as possible, with as complete a coverage in terms of size, sub-sector and geography as possible.

The report feeds into PhINTO's strategic planning and their contribution to the National Skills Foresight exercise. The survey material is complemented by supporting secondary data from a range of sources, which allows specific aspects of the sector to be examined. The postal survey was complemented and enhanced by a series of telephone interviews and focus groups designed to explore some issues to be explored in more depth.

This report covers the results of these varied linked exercises.

9.1 Objectives

IES was commissioned by the Pharmaceutical Industry National Training Organisation (PhINTO) to undertake a survey of labour market, skills and training issues in the pharmaceutical and bio-pharmaceutical industry. PhINTO is sponsored by the Association of British Pharmaceutical Industries (ABPI) to act as a focus for skills and training issues for the whole pharmaceutical sector. As an NTO, PhINTO is part-funded by the DfEE to undertake several studies, of which this is one. This study was intended to help give more focus to the future strategic planning of PhINTO. The objectives were:

- to cover the full range of the sector in terms of size, sub-sectors and geographical distribution
- to establish a methodology for the long-term monitoring of skills and training issues in the sector
- to develop mechanisms whereby these issues could be disseminated to the sector, as well as partners in education and government

- to recommend how to incorporate these results into a Skills Foresight strategy for the sector.

9.2 The PhINTO remit

PhINTO takes an inclusive view of the pharmaceutical industry and includes pharmaceutical research, as well as manufacturers and distributors of pharmaceutical products and precursors. The PhINTO remit maps fairly well onto the Standard Industrial Classification (SIC) group 24.4: 'Manufacture of pharmaceuticals, medicinal chemicals and botanical products'. There are some minor problems with part of the PhINTO remit outside of 24.4. The main problem is that establishments that are solely involved in research are placed in SIC 73.1. However, overall this probably has marginal impact. Therefore it appears that the overall numbers in the SIC classification reflect the numbers within the PhINTO remit. This suggests a total of around 55,000 employees in about 725 establishments. However, the size distribution from the Annual Employment Survey (AES) for SIC 24.4 probably overemphasises the small establishments. Despite this, the AES indicates that 58.2 per of pharmaceutical establishments have fewer than ten employees and a further 19.8 per cent have between ten and 49 employees.

The pharmaceutical sector has been increasing the amount of R&D it undertakes: it now represents about 20 per cent of all UK R&D spending and employs about 19,000 researchers and support staff. In terms of R&D intensity, the pharmaceutical sector has by far the highest levels of R&D expenditure as a proportion of turnover.

This high R&D intensity is reflected in the high levels of educational attainment found amongst the industry's employees. As such, the sector is very reliant on the output of the educational system, at both the secondary and higher education levels. The information on skill needs and demand, by educational level, contained in this report will provide inputs to the continuing dialogue between the industry and the DfEE, schools and higher education, about numbers and the curriculum.

9.3 The survey sample

The large number of small establishments involved created particular problems in generating a representative sample, as small establishments are less likely to be recorded in publicly accessible databases. A lot of effort was expended trying to identify the smaller pharmaceutical and biopharmaceutical establishments. A starting point was the membership lists of ABPI, British In-Vitro Diagnostics Association (BIVDA), Bioindustry Association (BIA) and the Proprietary Association of Great Britain (PAGB). However, a wider range of sources was

also used to identify the smaller establishments that are often not members of these national bodies.

We also contacted many of these establishments to identify an appropriate named respondent. However, some establishments were unwilling to release names and we had to rely on a job title instead. In all, 493 establishments were identified, 422 of these with named respondents.

9.4 The survey response

Overall, a response rate of 33.2 per cent was achieved with 148 usable questionnaires. The response rate was partially boosted by eliminating 46 organisations on the original mailing list which proved to be inappropriately included. A response rate of about 35 per cent is the norm for surveys of this kind. However, given the nature of the sample, with large numbers of small organisations and ones that felt themselves to be inappropriate, the response is good and allows relatively detailed analysis. The fact that we could not obtain a stratified sample means that weighting the response to account for the under-response by the smaller organisations is not possible. Therefore, the main break variable has been size, and the responses need to be examined in this context. Another reason for not weighting the results is that it is clear that sometimes the surveys were passed up by small subsidiary establishments to headquarters for response.

To ensure that there was no systematic bias, apart from size in the pattern of non-response, a further analysis was undertaken. We telephoned 120 non-responders (about a quarter of the original sample) and obtained explanations for the non-response from 80. In the main, the reasons were on the lines of 'too busy' or the belief that as a small firm the issues were 'not relevant'. Similar studies of very small firms often suffer from the same sort of problems.

9.5 Targets for organisations

As part of the government's National Learning Targets for England there are two Targets for Organisations in terms of the proportion of organisations recognised by Investors in People (IiP). PhINTO has to generate sector targets, and needs the baseline data as the basis for generating any sector target. The first national target of organisations aims for 45 per cent of organisations with more than 50 employees to be recognised by Investors in People (IiP) by the year 2002. The second national target for organisations aims to have 10,000 organisations with between ten and 49 employees recognised by Investors in People (IiP) by the year 2000.

Of the respondents to the survey, 30 per cent of the organisations with more than 50 employees are IiP recognised. This is

significantly below the national target. With 2.9 per cent of organisations with more than 50 employees not going for re-recognition, much progress will have to be made to achieve the target. However, the rate of recognition has been increasing over the years and if trends continue, a figure of about 49 per cent should be achieved by the year 2002 if those currently recognised keep going for re-recognition.

At the same time, only 22.8 per cent of the organisations with between 11 and 49 employees are IiP recognised. This is a significantly greater percentage than the four per cent implicit in the target. However, it needs to be recognised that a further 17.6 per cent of organisations with between 11 and 49 employees have decided not to go for IiP re-recognition. This is quite a rate of loss and could seriously jeopardise the sector in meeting the National Target. It suggests that the strategic issue regarding IiP for the sector is maintaining the numbers with existing recognition. Publicity around the on-going benefits, while maintaining the status of those already recognised, may also lead to more organisations going for recognition in the first place.

The available data suggest that the pharmaceutical industry has recognition levels comparable with other high-technology manufacturing sectors. At the same time the levels are lower than the public sector but generally higher than low technology manufacturing and non-public sector services.

9.6 Targets for adults

The National Learning Targets also include Targets for Adults, expressed in terms of the proportion of all adults with qualifications at specific levels. The first target is for half those who are economically active (that is in employment or actively looking for work, and aged between 18 and 59 for females or 18 and 64 for males) to have at least an NVQ level 3 qualification by the year 2002. The second target is for 28 per cent of the economically active to have an NVQ level 4 qualification by the year 2002.

Over half (52 per cent) of the respondents' employees have an NVQ level 4 or equivalent qualification. Nearly two-thirds (64 per cent) have an NVQ level 3 and above qualification. This means that currently the pharmaceutical and biopharmaceutical sector is easily meeting the national targets. It is also estimated simply on the basis of the annual intake of higher education graduates, that these figures will be 55 and 67 per cent respectively by the year 2002.

It is clear that the sector has high skill levels, especially amongst the smaller organisations. Many employees are studying for further qualifications. However, those qualifications being studied for are usually at degree level and beyond. Therefore, study by employees is unlikely to add significantly to the

percentage with qualifications above NVQ level 4. However, there should be some gains due to employees studying NVQ level 3 qualifications, as those studying for these are likely not to have any qualifications in the first place.

9.7 Lifelong learning

In terms of the development of lifelong learning strategies 12.4 per cent of organisations already had them, while 28.5 per cent of organisations had yet to hear of them. The larger organisations were significantly more likely to have adopted these strategies. This suggests that PhINTO needs to help raise awareness of lifelong learning strategies and their benefits, especially amongst the smaller organisations.

9.8 Skills and training issues, by pharmaceutical activities

Pharmaceutical establishments rarely, if at all, operate in all the sub-sectors or activities that compose the whole industry. Some companies may operate across the board, but they usually have different establishments concentrating on different aspects or types of activities. Similarly, skills shortages, or training and recruitment problems, rarely impact across the board. This led to the inclusion of specific questions about the skills recruitment and training issues within a range of pharmaceutical activities or sub-sectors of the pharmaceutical and biopharmaceutical industry.

The most commonly mentioned activity, or sub-sector, mentioned by respondents was 'Sales and marketing' followed by 'Registration and regulatory affairs'. This in part reflects the proportion of non-UK based sales-only establishments amongst the respondents (17.7 per cent). However, these are also important functions for many of the UK based organisations, since ultimately the whole industry is dependent upon sales. There appears to be a specific problem with medical representatives, largely due to high levels of turnover and a need for constant updating of training.

Larger establishments were more likely to be involved with production sub-sectors and the associated 'Quality assurance'. In terms of ease of recruitment, 'Patenting' and 'Registration and regulatory affairs' were the hardest to fill, followed by 'IT and computing'. Reflecting in part the greater importance attached by the larger organisations to 'Production of ethical products', they also had significantly greater problems recruiting in this area.

'Sales and marketing' followed by 'IT and computing' generated the greatest training requirement, while 'Drug discovery' and 'Patenting' generated the least. It appears that 'Sales and marketing' as well as 'IT and computing' generate an ongoing requirement for training, as technologies and products change.

while the skills required for 'Drug discovery' are usually acquired as part of a university postgraduate education.

Fortunately, perhaps the more generic 'Sales and marketing' and 'IT and computing' skills tend to have more widely available training material and courses. This is reflected in their high scores in terms of ease of delivering the training. However, there were many comments about the problems of generic training and its applicability within the pharmaceutical sector. Often, external training is seen as expensive and not directly relevant to the specific problems of the sector. For instance, selling pharmaceuticals is very different from selling mobile phones and requires different skills and training.

9.9 Skills and training issues by educational level

Skills and training issues also tend to vary according to the level of an individual's existing qualifications. Consistently, those with first degrees were rated as the most important for the organisation, followed by doctoral qualifications such as a PhDs or MDs. However, the doctoral qualifications were rated the most difficult to recruit. Overall, the higher the level of qualification the more difficult it was to recruit. While the lower skill levels were easier to recruit, there was an associated greater training requirement. In part, this is probably a reflection of the functions the lower skilled people were expected to perform, such as production functions, which had a higher training requirement.

9.10 Barriers to training

The main barriers to greater training were 'Cost of external courses' and 'Fees for consultants'. These problems were significantly greater for the smaller organisations. Importantly, organisations which had not been recognised by IiP also were significantly more likely to find these costs to be barriers to training. This is possibly an area for more industry wide initiatives and a area where the PhINTO could potentially develop future initiatives.

9.11 Non-sector-specific training issues

'Induction training' and 'Basic skills training' generated the greatest generic training requirements. Importantly, both of these were consistently rated higher than any of the pharmaceutical specific training issues. The larger organisations gave 'Management training', 'IT training' and 'Technical training' significantly higher ratings.

9.12 The regional dimension

The Annual Employment Survey indicates that the pharmaceutical sector is concentrated in London, the South East, the North West and the Eastern Government Office Regions with 18.8, 17.7, 10.4 and 10.3 per cent respectively of the total number of establishments. The AES also suggests that there are only 5.1 per cent of the total GB establishments in Wales and 6.7 per cent in Scotland. The IES/PhINTO survey only generated two responses in Wales, and five in Scotland, which means that no reliable analysis could be carried out. It seems that many of the Welsh and Scottish establishments are branch establishments and either were not caught by the sample generation process or were covered by the response of an English establishment.

9.13 Recruitment of new graduates

The Higher Education Statistics Agency (HESA) collates data on the initial destinations of full-time graduates from UK higher education institutions. A special analysis of their data was obtained detailing the gender, qualification level, subject of study and occupation of all those who entered the pharmaceutical sector (as defined by SIC 24.4).

This showed that the majority (53 per cent) of graduate entrants were female. This was particularly the case with the first degree entrants, where 55 per cent were female. The most important subject group was biological sciences, followed by the physical sciences (which includes chemistry). Other subject groups that were important included 'Subjects allied to medicine' (which includes pharmacology). This was particularly important at the postgraduate level, where the sector recruited 8.4 per cent of all those obtaining a 'Subjects allied to medicine' postgraduate qualification and entering employment. The sector also recruited a relatively large number of people who had obtained a 'Business and administrative studies' qualification. In terms of occupations entered, the majority entered professional occupations. The higher the qualification level the greater the proportion entering professional occupations.

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Annex A: The Questionnaire

THE SKILLS FOR A COMPETITIVE FUTURE

A Survey to Establish the Skills Needed for a Competitive Pharmaceutical/Biotechnology Industry

Confidential to the Institute for Employment Studies

Please answer the following questions as fully as you are able by ticking the boxes or writing in the spaces provided. Please return the completed questionnaire to IES in the reply-paid envelope provided. If you have any queries, please contact Nick Jagger (nick.jagger@employment-studies.co.uk) or Jane Aston at IES: telephone 01273 686751. All information will be treated confidentially. Thank you for your co-operation.

Background Information

We would like some background information about the business unit you are responding on behalf of, to put your later replies into context.

1. Please could you indicate the status of the unit you are responding on behalf of. *(Please tick one box only)*

The whole of your organisation	☐	A part of a larger UK company	☐
A subsidiary of another UK company	☐	A sales only subsidiary of a non-UK company	☐
A research/manufacturing subsidiary of a a non-UK company	☐		

2. Please could you indicate, *by ticking the appropriate boxes*, in the first column the pharmaceutical industry sub-sectors or activity that you operate in, and then in the second column the most important sub-sector or activity for your unit.

		Please tick all that apply	*Please indicate your most important activity by ticking **one** box only*
a	Drug discovery; Research·	☐	☐
b	Pre-clinical development; Development	☐	☐
c	Pre-registration clinical trials	☐	☐
d	Post registration clinical trials and marketing studies	☐	☐
e	Quality assurance	☐	☐
f	Primary production	☐	☐
g	Production of ethical and laboratory products	☐	☐
h	Production of over the counter products	☐	☐
i	Patenting	☐	☐
j	Registration and regulatory affairs	☐	☐
k	Sales and marketing	☐	☐
l	IT, computing	☐	☐

Size of Your Unit

3. How many are permanently employed (headcount) by the responding unit, excluding agency, contract or outsourced staff? *(Please tick one box)*

1-10 ☐ 11-49 ☐ 50-199 ☐ 200-499 ☐ 500-999 ☐ 1,000 plus ☐

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Outsourcing

4. Please could you indicate, *in the first set of columns*, the extent to which your unit **outsource a range of functions** and, *in the second set of columns*, could you indicate the extent to which your unit **performs outsourced services** for others?

		Your unit outsources			***Your unit performs***		
		none	*some*	*all*	*none*	*some*	*all*
a	Contract research (in universities)	☐	☐	☐	☐	☐	☐
b	Contract research (non university)	☐	☐	☐	☐	☐	☐
c	Toxicology testing	☐	☐	☐	☐	☐	☐
d	Clinical trials	☐	☐	☐	☐	☐	☐
e	Contract manufacturing	☐	☐	☐	☐	☐	☐
f	Contract selling	☐	☐	☐	☐	☐	☐
g	Other *(Please specify below)*	☐	☐	☐	☐	☐	☐

.....

Recruitment, Skills and Training Issues by Pharmaceutical Sub-sector/Activity

5. Please could you indicate, *by circling the appropriate numbers*, both the importance to your unit of the following activities (*in the first set of columns*) and the ease with which you recruit people into that area (*in the second set of columns*)

		Importance to organisation					**Ease of recruitment**				
		Unimportant				Essential	Very difficult				Easy
a	Drug discovery; Research	1	2	3	4	5	1	2	3	4	5
b	Pre-clinical development; Development	1	2	3	4	5	1	2	3	4	5
c	Pre-registration clinical trials	1	2	3	4	5	1	2	3	4	5
d	Post registration clinical trials, etc.	1	2	3	4	5	1	2	3	4	5
e	Quality Assurance	1	2	3	4	5	1	2	3	4	5
f	Primary production	1	2	3	4	5	1	2	3	4	5
g	Production of ethical & laboratory products	1	2	3	4	5	1	2	3	4	5
h	Production of over the counter products	1	2	3	4	5	1	2	3	4	5
i	Patenting	1	2	3	4	5	1	2	3	4	5
j	Registration and regulatory affairs	1	2	3	4	5	1	2	3	4	5
k	Sales and marketing	1	2	3	4	5	1	2	3	4	5
l	IT, computing	1	2	3	4	5	1	2	3	4	5

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6. Please could you indicate for your unit, *by circling the appropriate numbers*, both the extent to which each of the following activities generate a training requirement (*in the first set of columns*) and the ease (either due to cost or availability) with which you manage to either internally deliver or externally obtain that training (*in the second set of columns*)?

		Training requirement					**Ease of delivering training**				
		Low				High	Very difficult				Easy
a	Drug discovery; Research	1	2	3	4	5	1	2	3	4	5
b	Pre-clinical development; Development	1	2	3	4	5	1	2	3	4	5
c	Pre-registration clinical trials	1	2	3	4	5	1	2	3	4	5
d	Post-registration clinical trials, etc.	1	2	3	4	5	1	2	3	4	5
e	Quality Assurance	1	2	3	4	5	1	2	3	4	5
f	Primary production	1	2	3	4	5	1	2	3	4	5
g	Production of ethical & laboratory products	1	2	3	4	5	1	2	3	4	5
h	Production of over the counter products	1	2	3	4	5	1	2	3	4	5
i	Patenting	1	2	3	4	5	1	2	3	4	5
j	Registration and regulatory affairs	1	2	3	4	5	1	2	3	4	5
k	Sales and marketing	1	2	3	4	5	1	2	3	4	5
l	IT, computing	1	2	3	4	5	1	2	3	4	5

Recruitment problems

7. Please could you briefly describe your units main recruitment problems: (*Please continue on a separate sheet if necessary*)

.....

.....

.....

Recruitment, Skills and Training Issues by Highest Educational Level

8. We are interested in the **highest** qualifications currently held by each of your units staff. Please could you write in either the numbers (headcount) of staff whose highest qualifications are at each level, or percentages of your unit's staff in each category. Could you also indicate whether these numbers are estimates or reasonably accurate numbers.

		Absolute numbers	or	Percentages
a	Doctoral degrees PhD's or MD's			
b	Masters or NVQ level 5 qualification			
c	First degree level qualification			
d	HNC, HND or NVQ/SVQ level 4 qualification			
e	GNVQ, 'A' Level or NVQ/SVQ level 3			
f	'O' level, GCSE Grade C or NVQ/SVQ level 2 or below			
	Total (*This should be the same as the answer to Q3*)	Total		100.0%

These numbers are an *Estimate* ☐ or these numbers are *Reasonably Accurate* ☐

9. How important are people with the following **highest** qualifications to your unit and how easy are they to recruit? Please indicate, *by circling the appropriate numbers*, the importance to your unit of people with the following highest levels of qualification (in the first column) and the ease with which you recruit people at these educational levels (in the second column)?

		Importance to organisation					**Ease of recruitment**				
		Unimportant				Essential	Very difficult				Easy
a	Doctoral degrees PhD's or MD's	1	2	3	4	5	1	2	3	4	5
b	Masters or NVQ level 5 qualification	1	2	3	4	5	1	2	3	4	5
c	First degree level qualification	1	2	3	4	5	1	2	3	4	5
d	HNC, HND or NVQ/SVQ level 4	1	2	3	4	5	1	2	3	4	5
e	'GNVQ, 'A' Level or NVQ/SVQ level 3	1	2	3	4	5	1	2	3	4	5
f	'O' level, GCSE Grade C or NVQ/SVQ level 2 or below	1	2	3	4	5	1	2	3	4	5

10. Please could you indicate, *by circling the appropriate numbers*, both the extent to which people at each of the following levels of educational attainment generate a training requirement (in the first column) and the ease (either due to cost or availability) with which you mange to either internally deliver or externally obtain that training (in the second column)?

		Training requirement					**Ease of delivering training**				
		Low				High	Very difficult				Easy
a	Doctoral degrees PhD's or MD's	1	2	3	4	5	1	2	3	4	5
b	Masters level qualifications	1	2	3	4	5	1	2	3	4	5
c	First degree level qualifications	1	2	3	4	5	1	2	3	4	5
d	HNC, HND or NVQ/SVQ level 4	1	2	3	4	5	1	2	3	4	5
e	GNVQ, 'A' levels or NVQ/SVQ level 3	1	2	3	4	5	1	2	3	4	5
f	'O' level, GCSE Grade C or NVQ/SVQ level 2 or below	1	2	3	4	5	1	2	3	4	5

11. We are interested in how many of your unit's employees are studying for additional higher qualifications. Please could you indicate the numbers of staff in your unit who are studying for further qualifications by level of qualification sought? (*Please enter the numbers in the appropriate boxes*)

		Absolute numbers
a	Doctoral degrees PhD's or MD's	
b	Masters or NVQ level 5 qualification	
c	First degree level qualification	
d	HNC, HND or NVQ/SVQ level 4 qualification	
e	GNVQ, 'A' Levels or NVQ/SVQ level 3 qualification	
f	'O' Level, GCSE grades A to C or NVQ/SVQ level 2	
g	GCSE below grade C or NVQ/SVQ level 1	
h	Other lower or no qualifications	
	Total (This should be the same as in Q8)	

Investors in People (IiP)

12a. Has your unit (or the whole organisation) formally committed to IiP (Investors in People)? *(Please tick one box only)*

Yes ☐ No ☐ Don't know ☐

12b. If your unit (or whole organisation) has not formally committed to IiP (Investors in People) Please could you give a reason. *(Please continue on a separate sheet if necessary)*

.....

.....

12c. Is your unit (or the whole organisation) recognised as an Investor in People (IiP)? *(Please tick one box only)*

Yes ☐ *Go to Q11e* No ☐ *Go to Q12* Not going for re-recognition ☐ *Go to Q11d*

12d. If you are not going for re-recognition, could you briefly indicate why not? *(Please continue on a separate sheet if necessary)*

.....

.....

12e. If you are recognised by IiP when did your unit (or the whole organisation) receive the award? *(Please write in)*

Month ☐ Year ☐

Life Long Learning Strategies

13a. Does your company or your responding unit have a 'Life Long Learning Strategy'? *(Please tick one box)*

Yes ☐ *Go to Q12b* No ☐ *Go to Q12c* Not heard of 'Life Long Learning Strategies' ☐

13b. If you have a 'Life Long Learning Strategy' could you briefly outline the main points below?

.....

13c. If you do not have a 'Life Long Learning Strategy' could you indicate whether you are planning one?

Yes ☐ No ☐ Don't know ☐

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Other Training Issues

14. Please could you indicate, *by circling the appropriate numbers*, both the extent to which your unit requires the following types of training and the ease (either due to cost or availability) with which you manage to either internally deliver or externally obtain that training?

		Training requirement					**Ease of delivering training**				
		Low				High	Very difficult				Easy
a	Induction training	1	2	3	4	5	1	2	3	4	5
b	Basic skills training	1	2	3	4	5	1	2	3	4	5
c	Continuing Professional Development	1	2	3	4	5	1	2	3	4	5
d	Management training	1	2	3	4	5	1	2	3	4	5
e	IT training	1	2	3	4	5	1	2	3	4	5
f	Refresher/update training	1	2	3	4	5	1	2	3	4	5
g	Technical training	1	2	3	4	5	1	2	3	4	5
h	Other *(Please specify below)*	1	2	3	4	5	1	2	3	4	5

.....

Barriers to Training

15. Please could you indicate, *by circling the appropriate numbers*, the extent to which the following factors limit the amount of training you provide for your unit's staff?

		Does not restrict				**Major restriction**
a	Releasing people from their work	1	2	3	4	5
b	Cost of external courses	1	2	3	4	5
c	Quality of external courses	1	2	3	4	5
d	Training system set up costs	1	2	3	4	5
e	Fees for consultants	1	2	3	4	5
f	Appropriate identification of training needs	1	2	3	4	5
g	Measuring the effectiveness of training	1	2	3	4	5
h	Lack of sufficiently specific course	1	2	3	4	5
i	Other *(Please specify below)*	1	2	3	4	5

.....

Main training problem

16. Please could you briefly describe your main training problems or issues?
(Please continue on a separate sheet if necessary)

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Contact Details

17. *Please could you give us your name and telephone number*

Name: .....

Telephone number: .....

E-mail: .....

Follow-up Interviews

18. We would like to follow up this survey with a small number of telephone interviews, please could you indicate whether you would be willing to take part in these follow-up interviews.

Yes ☐ No ☐

Any Additional Comments

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Thank you for your assistance. Please return the completed questionnaire in the reply paid envelope direct to:

The Institute for Employment Studies
FREEPOST, Mantell Building, University of Sussex, Brighton, BN1 9BR
If your have any queries please do not hesitate to contact me, Nick Jagger, on (01273) 686751

Appendix B: SIC Code 24.4 and the PhINTO Remit

The SIC code 24.4 (Manufacture of pharmaceuticals, medicinal chemicals and botanical products) is divided into two classes: 24.41 (Manufacture of basic pharmaceutical products) and 24.42 (Manufacture of pharmaceutical preparations). The SIC class 24.42 is in turn divided into two sub-classes: 24.42/1 (Manufacture of medicaments) and 24.42/2 (Manufacture of non-medicaments).

These classes and sub-classes are defined as follows.

24.41 Manufacture of basic pharmaceutical products includes:

- investigation, perfecting and production of medicinal active substances to be used for their pharmacological properties in the manufacture of medicaments
- processing of blood
- manufacture of chemically pure sugars
- processing of glands and manufacture of extracts of glands, *etc.*

24.42/1 Manufacture of medicaments includes:

- manufacture of medicaments defined as such in Community law:
  - anti-sera and other blood fractions
  - vaccines
  - diverse medicaments including homeopathic preparations.
- manufacture of chemical contraceptive products for external use and hormonal contraceptive medicaments.

24.42/2 Manufacture of non-medicaments includes:

- manufacture of dental fillings and bone reconstruction cements
- manufacture of medical impregnated wadding, gauze, bandages, dressings, surgical gut string *etc.*

Importantly, the definition of the pharmaceutical industry used by PhINTO and the self-definition of relevant enterprises does not include the manufacture of non-medicaments.

Another area not in the PhINTO remit is excluded from the 24.4 SIC code, *ie*: 52.31 'Dispensing chemists' and 51.46 'Wholesale of pharmaceutical goods'. However, pharmaceutical R&D establishments which are coded under SIC 73.10 are included in the PhINTO remit. SIC code 73.10 is defined as including:

> *'Systematic studies and creative efforts in the three types of research and development ... [basic research, applied research, and experimental development ... in natural sciences (mathematics, physics, astronomy, chemistry, life sciences, medical sciences, earth sciences, agriculture etc.). They are intended to increase the stock of knowledge and improve the use of this stock of knowledge.'*

It is felt that the inclusion of the manufacture of non-medicaments in SIC 24.4 counterbalances the exclusion of the R&D establishments. This is particularly the case as pharmaceutical R&D units within a wider pharmaceutical establishment will be counted as 24.4, rather than 73.10.

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Skills for a Competitive Future: a survey for the Pharmaceutical Industry National Training Organisation

N Jagger, J Aston

The pharmaceutical industry is one of the UK's most research intensive and internationally competitive industries. It achieves its competitive position by investing in skills, and in research and development. This study examines skills, recruitment and training issues covering the whole pharmaceutical industry. The 'Skills for a Competitive Future' survey was commissioned by the Pharmaceutical Industry National Training Organisation (PhINTO) as part of their remit to assess and improve skills and training in the industry. At the same time, the study examines the industry's contribution to the National Training Targets. These include training difficulties and barriers to training and the pattern of investors in People recognition.

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